FLYING

AUGUST 1946

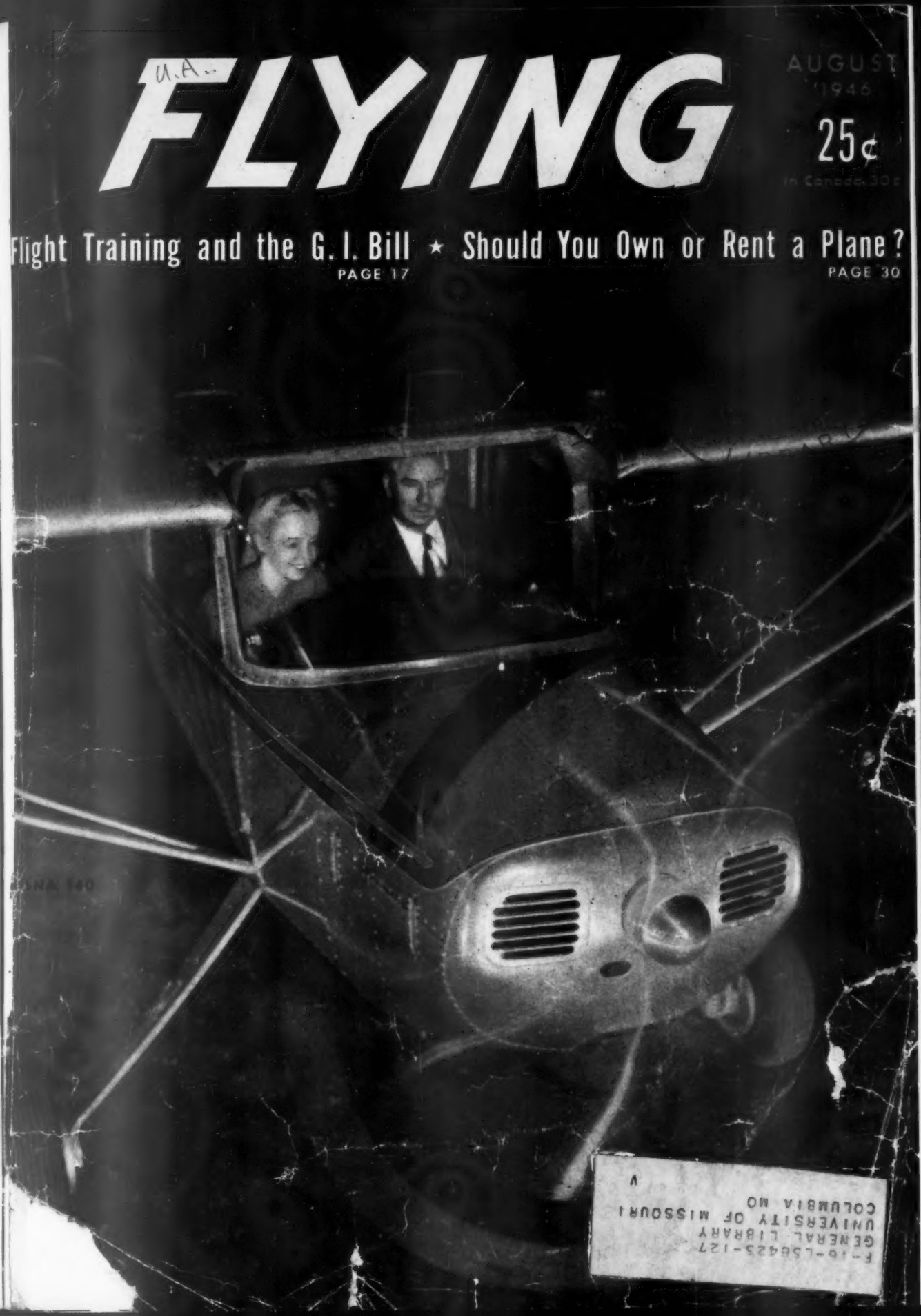
25¢

In Canada 30¢

Flight Training and the G. I. Bill ★ Should You Own or Rent a Plane?

PAGE 17

PAGE 30



F-10-L56425-127
GENERAL LIBRARY
UNIVERSITY OF MISSOURI
COLUMBIA MO

Aristocrat of personal airplanes

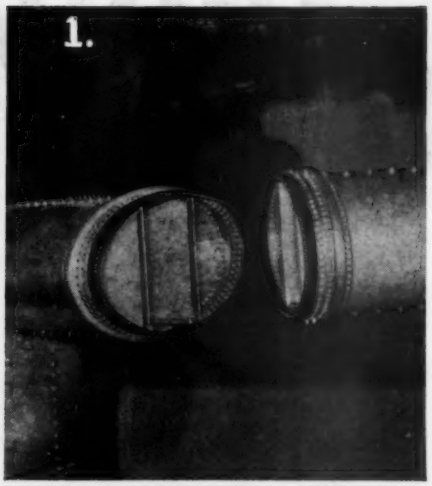
GLOBE SWIFT GC-1A

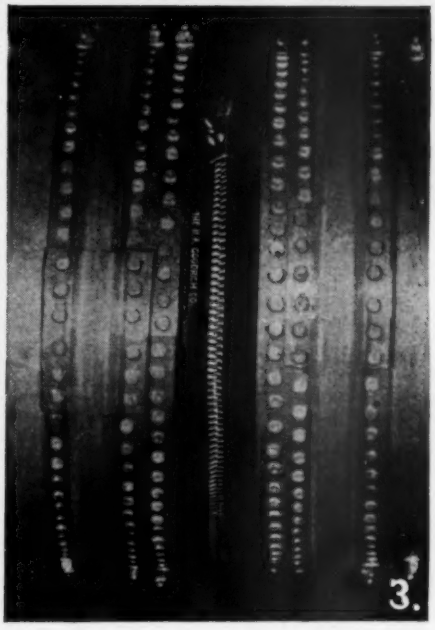
Manufactured under C.A.A.
Approved Certificate No. 766

The Swift

GLOBE AIRCRAFT CORPORATION • FOR[T]

JOHN KENNEDY, *President*





How to zip an airplane's windpipe

TORNADOES of air are sucked in, rammed through, and rocketed out behind four huge propjet engines of the new XF-12, military prototype of the Republic "Rainbow" Transport. All this air roars through long, winding duets . . . and these "windpipes" used to be problem children.

Ducts had to be made in sections. Sections had to have tight joints because air goes through under heavy pressure. Yet the joints must be easily disconnected and re-sealed to permit frequent removal and replacement of duct sections. And that was a puzzler.

A new type of B. F. Goodrich Zipper supplied the answer. Not the ordinary kind, but one that's made with a precision-molded rubber seal that opens and closes with the zipper. A unique arrangement of overlapping rubber lips provides an effective seal for pressures up to the structural strength of the zipper itself.

These Pressure-Sealing Zippers make duct sealing an amazingly simple operation as shown in the 1-2-3 sequence above. Note that the molded lips go all the way around, to give 100% effective seal. This feature works equally well on kidney-shaped ducts or other odd shapes where clamps will not work. The zipper is a space-saver, too. It requires no cumbersome end connections and occupies no more space than an ordinary zipper.

Today there are many important and interesting aeronautical applications for B. F. Goodrich Pressure Sealing Zippers. Get more complete facts by writing to The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.

B.F. Goodrich

FIRST IN RUBBER

FLYING

Reg. U. S. Pat. Off.

AUGUST • 1946

CIVIL AVIATION

Flight Training and the GI Bill ..... L. S. Willis 17
Air Hostel 19
Should You Own or Rent a Plane? ..... Neil B. Berboth 30
R for Selling Aviation ..... Philip Lesly 32
Flying's Test Pilot—The Ercoupe 34
How Much Is True About the Helicopter? ..... Paul Fountain 39
Let's Fly Up to Canada ..... James Montagnes 40
Airmen's Sign Language 47
Power-Line Patrol 52

MILITARY AVIATION

Why the Jap Air Force Failed ..... John La Cerda 44

ENGINEERING

Britain's Lightplanes ..... Maj. Oliver Stewart and Sq. Ldr. D. West 27
FLYING Cutaway (The Ercoupe) 35
The Magic Mariner ..... Douglas J. Ingells 42

AIR COMMERCE

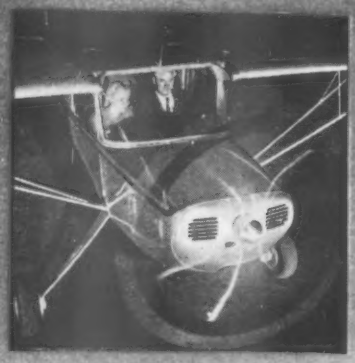
Clippers for Sale 50

DEPARTMENTS

Letters 6
Have You Heard? 8
The Month's Best 24
Report from Washington ..... Fred Hamlin 46
London Letter ..... Maj. Oliver Stewart 55
Have You Seen? 56
I Learned About Flying From That!—No. 81 ..... Clement G. Scerback 59
The Library 60
AOPA News 62
Fifteen Years Ago 64
The Goldfish Club 78
Photo Credits 116

COPYRIGHT 1946
ZIFF-DAVIS PUBLISHING COMPANY
Editorial Offices, 185 North Wabash Ave., Chicago 1, Ill.
Member of the Audit Bureau of Circulations
VOLUME 39 • NUMBER 2

FLYING is published monthly by Ziff-Davis Publishing Company at 185 N. Wabash Ave., Chicago 1, Ill.; New York Office, Empire State Building, New York 1, N. Y., Frank Bennett, Eastern Advertising Manager, Los Angeles, Calif., William L. Pinney, Western Advertising Manager, William M. Springer, Midwestern Advertising Manager, Canadian Advertising Representative, G. J. McGoey, 21 King Street, East, Toronto, London Advertising Representative, J. Forecast, Newspaper Representations, Ltd., 231-232 Strand, London, W. C. 2, Washington Office, International Building, 1319 F Street N.W. SUBSCRIPTION RATES: In U. S., 12 issues, $3.00, single copies, 25c; in Mexico, South and Central America and U. S. Possessions, 12 issues, $3.00; in Canada, 12 issues, $3.50, single copies, 30c; in British Empire, 12 issues, $4.00. All other foreign countries, 12 issues, $4.00. Subscribers should allow two weeks for change of address. Address all subscription letters to the Director of Circulation, Flying, 185 North Wabash Avenue, Chicago 1. Entered as second class matter, September 8, 1942, at the Post Office, Chicago, Illinois, under the act of March 3, 1879. Entered as second class matter at the Post Office Department, Ottawa, Canada. Contributors should retain copy of contributions. All submitted material must contain return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Accepted material is subject to whatever adaptations and revisions are necessary to meet requirements. Payment covers all authors', contributors' and contestants' rights, title and interest in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.



THE COVER

The Cessna 140 on this month's cover was photographed at night as it taxied to the hangar at Sky Harbor airport, Northbrook, Ill. Photographer Arthur Haug got the unusual angle shot from the hangar roof. The man at the controls is Bill Heising, Chicago night club owner and a private pilot.

WILLIAM B. ZIFF
Editor and Publisher

B. G. DAVIS
General Manager

MICHAEL H. FROELICH
Assistant to the Publisher

MAX KARANT
Managing Editor

CURTIS FULLER
Assistant Managing Editor

Associate Editors
CHICAGO
Paul Fountain,
C. Budd Dugan, J. Feely

WASHINGTON
Fred Hamlin

NEW YORK
John H. Lancaster

LOS ANGELES
Gaither Littrell

LEW MERRELL
Art Editor

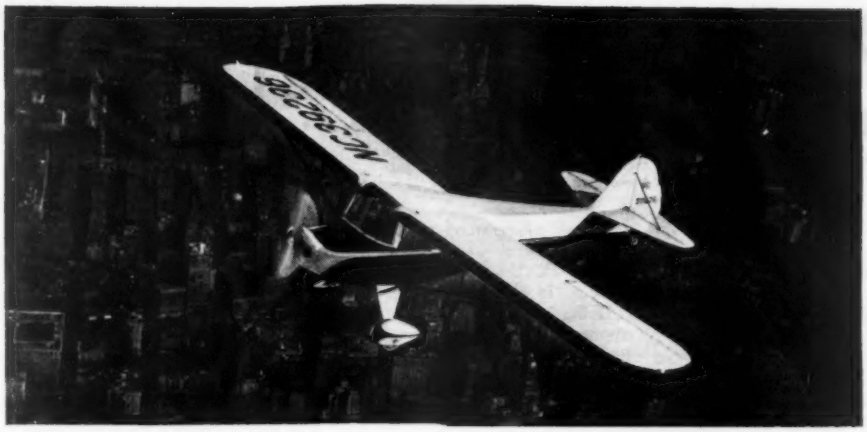
Staff Photographers
ARTHUR HAUG
WALTER STEINHARD

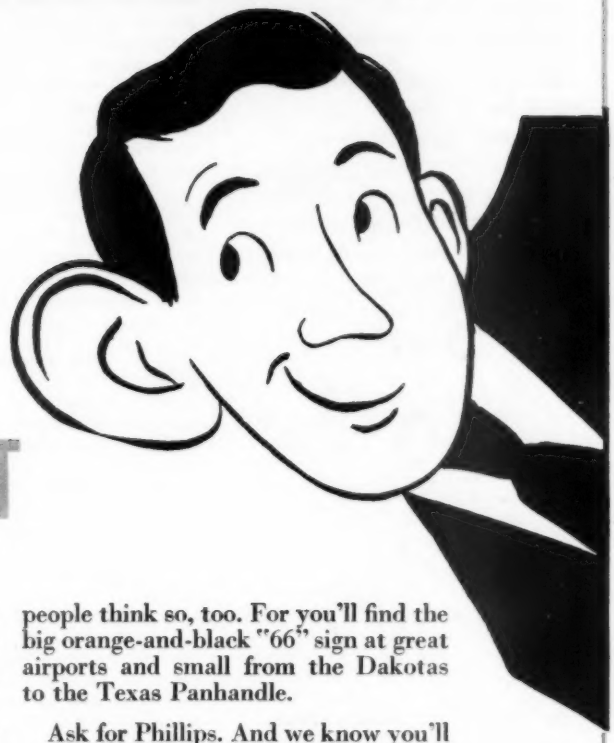
HERMAN R. BOLLIN
Art Director

GEORGE BERNER
Advertising Director

H. J. MORGANROTH
Production Director

H. G. STRONG
Circulation Director





TIP TO A MAN ABOUT TO BUY A TAYLORCRAFT

Look, nobody's happier for you than we are. You're on the brink of a new way of having fun—as well as doing business. We're all for you.

But take our advice. When it comes to fuels and lubricants for your plane—there's only one kind to use—*the very best.*

Throughout the great Middle West, we think *that* means Phillips Aviation Products. Apparently a lot of other people think so, too. For you'll find the big orange-and-black "66" sign at great airports and small from the Dakotas to the Texas Panhandle.

Ask for Phillips. And we know you'll appreciate the fact that we've gone to a great deal of trouble to speed a plentiful supply of *un-leaded* 80 octane fuel to every Phillips air-field tank. Let's get acquainted.

We'll be seeing you!

Phillips 66

AVIATION GASOLINE

HANGAR FLYING

LOCKHEED

The Wet Load

The first cargo carried by the *Constellation* was put aboard via a four-inch fire hose. It consisted of 8.8 tons of water. This doesn't sound like a very intelligent choice of payload, but under the circumstances it was.

When Lockheed engineers first took No. 61 (the test *Constellation*) into the air, they wanted to know how the ship reacted to shifts in its center of gravity. So they originated and installed a system of water ballast tanks. The interior of the cabin looked like a cross between a hardware store and an aquarium.

By merely turning various valves, engineers could shift a ton or two of load from here to there in flight. Much easier than lugging sandbags around, and a lot more accurate. And since flight test costs on the *Constellation* ran to about $6200 an hour, the system more than paid for itself by speeding up the whole test program.

This rig, another example of the old Lockheed moxie, proved to engineers that the *Constellation* is a remarkably stable plane. More so, in fact, than any other large transport.

L to L for L

© 1946, Lockheed Aircraft Corp., Burbank, Calif.

LETTERS

ARMY PILOT TALKS BACK

I enjoyed everything in the March issue of FLYING except John H. Geisse's article "Is Private Flying Oversold?"

Being a former Army pilot, I think it's about time the ex-service pilots did a little talking back. Just which of Mr. Geisse's many surveys shows that so much low flying is being done by Army and Navy boys? Since my return to civilian life I've been around quite a number of airports and it's always the same story—prejudice against service pilots is tremendous.

I'd like to thank the citizens who, as Mr. Geisse stated, particularly tolerated the noisy service planes. No doubt that was Mr. Geisse's contribution to the war effort, too.

EARL W. SCHOTT

Greenfield, Ind.

● Reader Schott will find plenty of proof of service pilots' recklessness with civil aircraft in the files of all aviation insurance companies, the CAB, and the AAF's Air Safety Command.—ED.

THE OPERATOR'S SIDE

As yet, I haven't seen an article in any aviation magazine explaining why airport operators aren't making the much-needed facility improvements that many articles advocate.

Can an operator pay several men to do nothing but provide fast line service for three or four transient planes each week? Can he provide a first-class restaurant just to feed the occupants of these few planes?

He can provide these facilities only if he has enough local business. If he is located at an airline terminal, transient business probably warrants such facilities; otherwise he can't provide them at a continued loss.

Your articles on the problem may help wake up the operator to the need of improvements but won't they also tend to keep the newcomers out of private flying? In any event let's have some writer take the operator's side in just one article.

G. POPLIN

Seattle, Wash.

● FLYING does not advocate expensive, unnecessary additions to existing airports. Major criticism of many operators has been—and still is—that they do an unbelievably sloppy and inefficient job with what facilities they have.—ED.

G. I. BILL

According to the circular issued by the Veteran's Administration, only flight schools with secondary ratings will be approved to give flight training to ex-service men under Public Law 268, so as to insure "adequate equipment and a sufficient number of qualified instructors."

After a great deal of contemplation I am still unable to see how any more equipment than an airworthy airplane is necessary to prepare a student for either a private license or an instructor's rating. Thousands of private pilots and competent instructors have been trained in schools having neither extensive ground school equipment nor a large teaching staff. There is also a large number of former military pilots possessing commercial licenses who need only from 20 to 50 hours in lightplanes to qualify as instructors. The ground schooling needed can be given by any certificated flight instructor.

The majority of small airports now being opened are managed by those of us who have just returned from the armed services. To be able to give training under the "G. I. Bill" would help insure our success but the large operators who made fortunes with the war training programs again have sewed up the business for themselves. The so-called "GI Bill of Rights" is becoming a bit ironical to us ex-GIs who are trying to get started in the aviation industry.

JOE COULTER

Cisco, Tex.

● See "Flight Training and the GI Bill" on page 17.—ED.

DEPTH PERCEPTION NECESSARY?

In 1937 a CAA doctor in Macon, Ga., told me I was unfit to fly. Since then I have logged 1,800 hours in every type of single-engined aircraft from *Cubs* to *Mustangs*. I have instructed, dusted, fought and barnstormed, not knowing how unsafe I am with my 20/25 acuity and 40-mm. depth perception.

In 1941 I had 500 hours, an instructor's rating and was 20 years old. I couldn't pass an Army physical (or a CPT physical in 1939). The RAF took me and wasn't sorry. Neither was I sorry because I was able to transfer to the Army and fly with the boys I envied so much when they got free CPT flying and Army training while I was eligible for nothing.

M. L. A.

Daytona Beach, Fla.

NEED BETTER MAPS

A short time ago I ordered a sectional aeronautical chart from the Coast and Geodetic Survey. Where I live there were, during the war, innumerable defense zones, danger areas, prohibited areas, etc. So, wishing to fly safely several months after V-J day I ordered the map. What do I get but a June, 1945, issue replete with the aforementioned areas. I wanted to fly down to Cape Cod but right across the whole cape is a danger area. How am I to know whether that area is safe?

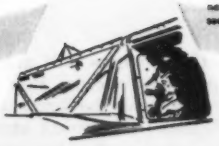
I have other map complaints, too. The fellow that draws them must think we fly

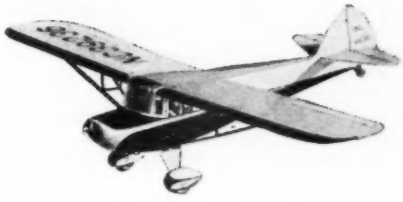
(*Continued on page* 108)

the four-most side-by-side personal plane

HIGHER—*World's Altitude Record for Light Planes*

24,311 feet. Set by Grace Huntington at Los Angeles, Cal. International record for airplanes of second category.





FURTHER — *1700 Miles in 16½ Hours*

Flight made by Mrs. Evelyn Burleson from Vancouver, B. C. to Tia Juana, Mexico. Gross load of 1462 pounds.

LONGER — *14 Days Aloft in a Taylorcraft*

Hustor and Humphrey Moody took off on July 23, 1939, and landed two weeks later.

FASTER—*Speed Record for Light Planes*

Winner of the Firestone Trophy at the races held at Miami in Feb. 1946.

Taylorcraft

WORLD'S LARGEST BUILDERS OF SIDE-BY-SIDE AIRPLANES

best buy in the sky

Hurdling the mountains or girdling the lowlands—
Taylorcraft turns in a flawless performance.
The foremost plane in its class—it holds
the four most important records. It's the plane
that goes farther, faster, higher and longer!
It's the plane that is as economical as a car! It's the
plane that easily lands in any field or pasture!
No wonder the safe T'craft is called the
"Best Buy in the Sky" by men who've
found their place in the sky!

TAYLORCRAFT AVIATION · ALLIANCE, OHIO

RANGER
REG. U. S. PAT. OFF.
RADIO
Gives You
√ LIGHTER WEIGHT
√ SMALLER SIZE
√ PANEL MOUNTING
in 3" instrument hole
√ FIXED ANTENNA with
trailing wire performance
√ DRY BATTERY OR 12-VOLT
MODELS; 2 or 15-watt output

√ IMMEDIATE DELIVERIES from
leading aircraft and accessory dealers

RANGER aircraft radio owners—everywhere—are enthusiastic about and high in their praise of these truly post-war transmitters and receivers. Now available through leading dealers throughout the nation—see them and you will agree that RANGER radios are the best buy for you.

FREE PILOT AIDS—*get yours*

The Range Station Guide lists U.S. and Canadian range stations, call letters and frequencies; pocket-size, contains range orientation instructions, will prove a great help on cross-country trips. The Radiotelephone Procedure Manual takes the mystery out of correct 2-way radio communication with many examples on proper radio usages. Get your free copies from RANGER dealers or write for them.

ELECTRONIC SPECIALTY CO.
3454 GLENDALE BLVD.
LOS ANGELES 26, CALIFORNIA
Manufacturers of
RANGER
REG. U. S. PAT. OFF.
RADIO EQUIPMENT

HAVE YOU HEARD?

. . . **Sweptback wings will aid a Navy bid for supersonic speeds.** Bell Aircraft engineers removed the original wings from a standard Kingcobra and substituted 35° sweepback. (See page 56.) Designated the L-39, the plane is intended only as a wing-design experiment in high-speed flight.

. . . **Veterans may rent flying facilities for $5 per week**—that is the rate promised by the Veterans Flying Association. Paul F. McDuffee, chairman of VFA's New York Council, states that any 20 veterans can form a unit for which the association, a non-profit organization, will purchase planes and equipment at special prices, provide instruction, insurance and service on a mass scale that will make the low rates possible.

. . . **There'll be cigaret lighters in your plane,** according to Casco Products Corp. Among those planning to use the automobile-type lighter are Cessna, Beech, North American and Glenn L. Martin. Several other builders of both commercial and private aircraft are testing the equipment.

. . . **Aviation medicine research** will be continued at the Air Forces School of Aviation Medicine, Randolph Field, as part of the AAF's new university system. Special emphasis will be put on the effects of high-altitude flying, combating air sickness, vision testing, reaction of the brain to air pressure, suitability of diet, and protection against aircraft noise.

. . . **TWA has converted a Skytrain into a flying laboratory.** It will test various types of flying aids, including navigation and radar experiments to improve air traffic control and blind flying.

. . . **"Giftrip" is an air-age answer to the gift problem.** Through this new air travel program inaugurated by Trans-World Airline, a donor may purchase a gift ticket entitling the recipient to an air trip between designated points over TWA's 28,000-mile transcontinental and international system. The ticket is enclosed in a special folder, bearing names of recipient and donor, destination of trip and date. It also has space for pertinent notes on the trip.

. . . **Here's a "capital" tip for a flying trip.** A two-month's flight tour touching every capital city in the United States was begun in June by a former AAF captain and his wife in their Aeronca. The flight was made under the auspices of the Aeronautic Association of Boston and with the endorsement of the National Aeronautic Association and the New England Council. The couple received invitations from 32 governors of various states heartily encouraging the tour. The air tourists planned to make a color motion picture of their trip.

. . . **A complete jet-propelled air fleet** is planned by England. John Wilmot, minister of supply, has revealed an order for a 38-ton jet transport which could carry passengers across the Atlantic at 600 m.p.h.

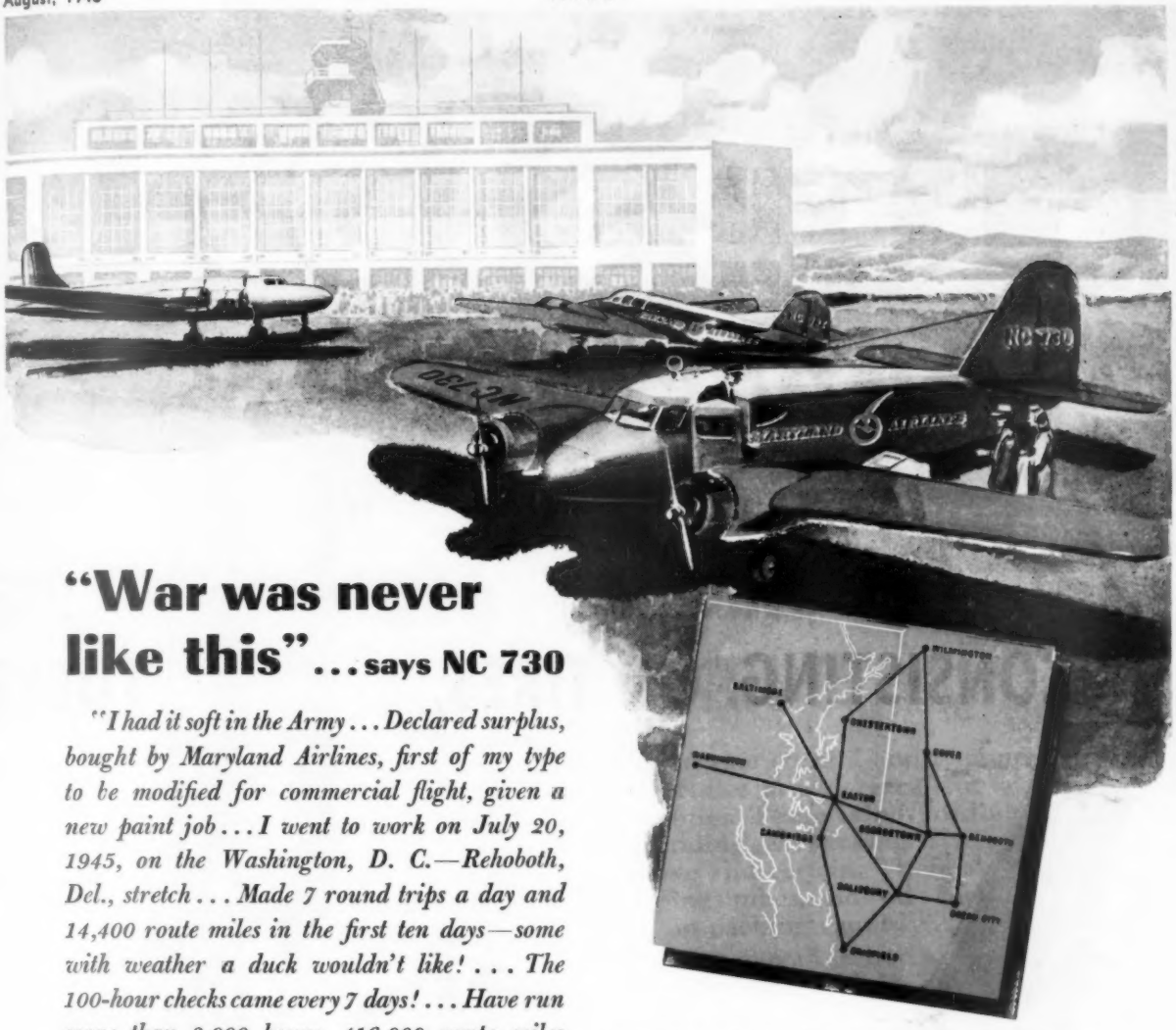
. . . **There's a new airport guide for the private pilot.** In the attempt to make cross country flying easier and more fun for the private pilot, Decker Air Services, Inc., recently published Decker's Airport Guide, which provides complete information about the nation's airports. The guide is printed in five pocket-size sections. Airports are arranged as they appear on sectional charts and information includes such facts as availability of meals and lodging, surface and direction of runways, type and location of wind indicators, landing lights, special landing or take-off regulations, mechanical and service facilities.

. . . **What is the weakest link in post-war civil aviation?** "The lack of suitable ground facilities for proper storage, maintenance and repair of civil aircraft," is the answer of Charles H. Babb, head of an aircraft brokerage company. Babb warns that "someone will have to get behind the program to provide these facilities if we are to have an enduring aviation."

. . . **Wire-recorded entertainment for passengers** will soon be offered by the airlines if experiments now being conducted at Lear, Inc., are successful. Each passenger would have his choice of programs played through individual speakers without disturbing other passengers. On larger planes speakers would be provided in lounges so that flight officers could make announcements over the system at any time.

. . . **First of CAA's new type production certificate** (No. 600) went to Lockheed Aircraft Corp. It authorized the company to certificate its Constellations.

. . . **Chicago may get a seaplane base.** The hangar building and area at the northwest end of Navy Pier have been recommended for such use by the Chicago Aero Commission. The Navy is still occupying the site. END

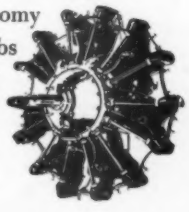


"War was never like this"... says NC 730

"I had it soft in the Army... Declared surplus, bought by Maryland Airlines, first of my type to be modified for commercial flight, given a new paint job... I went to work on July 20, 1945, on the Washington, D. C.—Rehoboth, Del., stretch... Made 7 round trips a day and 14,400 route miles in the first ten days—some with weather a duck wouldn't like!... The 100-hour checks came every 7 days!... Have run more than 3,000 hours, 416,000 route miles since August... War was never like this!"

"NC 730 with Jacobs R-755-9 engines inaugurated our service," says James E. Ryan, Vice-President of Maryland Airlines, soon to connect Washington, D.C., Baltimore and ten other Maryland and Delaware cities. "Together with three other Cessna UC-78's put in service later, these Jacobs-powered transports travelled more than a million miles in less than a year—with only routine engine care, service and overhaul!... For absolute dependability, top performance, operating economy, and easy, low cost maintenance—no one can find an engine better suited to small transport requirements than the Jacobs."

Such a record requires no elaboration... And now available is the improved version of the R-755-9 ... the Jacobs R-755A which delivers 33% more power with no increase in weight, consumes even less fuel and oil per hp hour! Other new Jacobs engines... with many valuable innovations, designed to meet current and future installation requirements, built with basic stamina that assures continued peak performance, dependability and economy ... are well worth waiting for!... Jacobs Aircraft Engine Company, Division of Republic Industries, Inc.



JACOBS • **Pottstown, Pa.**

Division of Republic Industries, Inc.

Firestone

the New SuperFlex

THE *First* AND *Only* PRE-
CONSISTING OF TIRES, TUBES,

Announces UNDERCARRIAGE

ASSEMBLED UNITS FOR LIGHT PLANES WHEELS, BRAKES AND STRUTS . . .

HERE'S good news for all who make or service light planes. Firestone pioneers again with the new SuperFlex Undercarriage, the *first* and *only* complete "packaged" undercarriage — tires, tubes, wheels, brakes and struts pre-assembled at the Firestone factory and ready to install.

Manufacturers can save valuable weight, time, space, labor and money by using Firestone SuperFlex pre-assembled undercarriages. The landing load is absorbed by rubber displacement and air compression resulting from the upward movement of the wheel. Recoil is positively controlled by the use of friction material.

Elimination of many parts used in conventional landing gears permits a welcome reduction in weight. Low oscillation rate control and damping characteristics provide excellent taxiing qualities. There is no possibility of the landing gear sticking. Extension is positive and certain. There are no telescoping tubes, no oil compartments, no packing glands.

Minimum overall section width and height make the Firestone SuperFlex landing gear ideal for retraction and permit lower center of gravity. Clean, compact design assures low drag in extended position.

Maintenance costs are remarkably low — service in less than one-year intervals is unnecessary, and the entire unit replacement of tire, tube, wheel, brake and absorption unit is easily and quickly accomplished by the removal of a few bolts and nuts.

For the best in music, listen to the "Voice of Firestone" every Monday evening, over N. B. C. network

Copyright, 1946, The Firestone Tire & Rubber Co.

It's PIPER CUB . . . The World's Top Choice

YOU'RE ahead right from the start with a new Piper Cub . . . the plane that has outsold all other light planes combined. You save on its cost—only $665 down—lowest of any airplane on today's market. You get there faster, with better gas mileage than the average car. And you learn to fly in your own plane, because a flying course goes with every purchase of a new Piper Cub.

Enjoy a flight demonstration, without charge, at your Piper Cub Dealer's. Take the controls, yourself. Easy, isn't it? A light touch . . . you're turning gracefully. A slight pressure . . . you're climbing . . . or gliding in for a leisurely landing. And safe—you can feel the built-in safety of the Piper design from the moment you leave the ground. No wonder most of today's pilots learned to fly in a Piper Cub.

See your dealer now—learn all about the new Piper Cubs.

LOOK TO THE LEADER
FOR GOOD SAFE PLANES YOU CAN AFFORD TO BUY AND FLY

PIPER

HERE ARE 3 FINE AVIATION BOOKS FOR *You!*

1. *Piper Cub Brochure.* Brand new! Beautiful, full-color airplane illustrations, suitable for framing. Complete specifications of Piper Cubs.

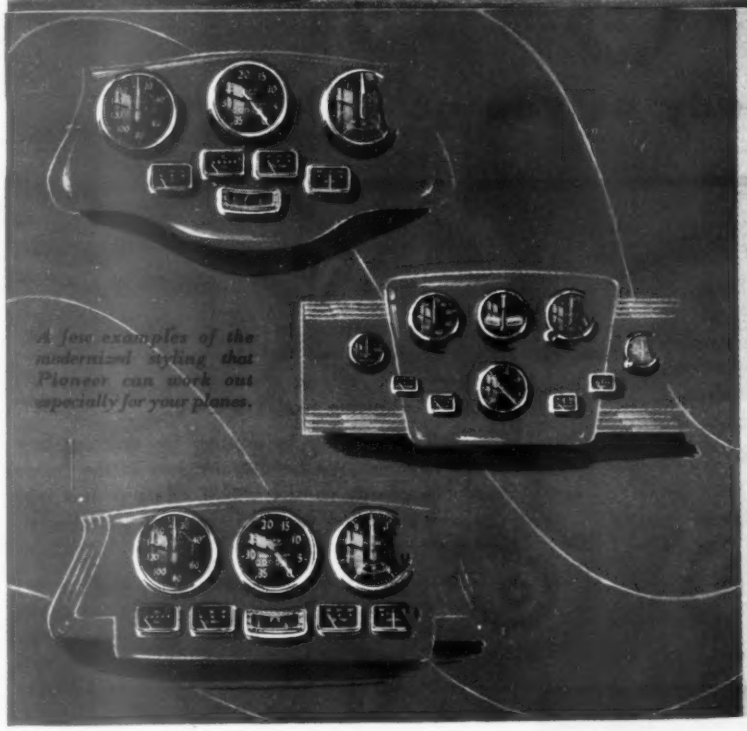
2. *"How to Fly" Book.* Takes you on a typical flying lesson with 53 step-by-step photos and descriptions. Many other interesting facts.

3. *"What Your Town Needs" Book.* Will help you or your community plan an inexpensive landing area now.

Get these books from your Piper Cub Dealer now. Or, if you prefer, send us 10c per book or 25c for all three. Use stamps or coins. Specify which books you desire. Write Dept. PA86.

PIPER AIRCRAFT CORPORATION
LOCK HAVEN, PENNA., U. S. A.
In Canada: Cub Aircraft Ltd., Hamilton

A profitable way to speed the change from car to cockpit!



PIONEER

REG. U.S. PAT. OFF.

Flight Control

Instrument Panels for personal planes

PRODUCT OF Bendix AVIATION CORPORATION

Car buyers have learned to expect beauty and luxury in automobiles. They make up the largest part of your market, and will expect the same standards of beauty in the planes they buy. Pioneer —*working with you*—will design Flight Control Instrument Panels especially for your planes to provide them with the up-to-the-minute styling that is a *must* for this ready-made demand. Furnished to you in complete units, they make possible marked savings in assembly costs, and eliminate the stocking of individual instruments both in your plant and at your distributors. Maintenance is greatly simplified, and service costs thereby substantially lowered. Find out more about Pioneer Flight Control Instrument Panels—the *new* way to greater sales appeal for your planes, and lowered manufacturing costs for you.

ECLIPSE-PIONEER DIVISION
of Bendix Aviation Corporation
TETERBORO • NEW JERSEY

Steady as you go

Product of many years' research and steady development, the Bell Helicopter is the first rotary-wing aircraft to receive an Approved Type Certificate from the CAA.

Bell is building helicopters for delivery late this summer. We believe ardently in the future of this unique rotor-craft. It offers a new and almost unlimited utility to government agencies, industry and agriculture.

Because it can take off vertically and fly low and slow, the Bell Helicopter unlocks the doors to hitherto inaccessible places. No landing strips or costly ground facilities are needed. A patented gyro stabilizing device assures inherent flight stability and offsets any tendency to tilt, pitch or sway. All the way is steady as you go.

To find out what this new kind of flight can mean to you in your business—write Helicopter Division, Bell Aircraft Corporation, P. O. Box 1, Buffalo 5, New York.

BELL *Aircraft* CORPORATION

©1946 B.A.C.

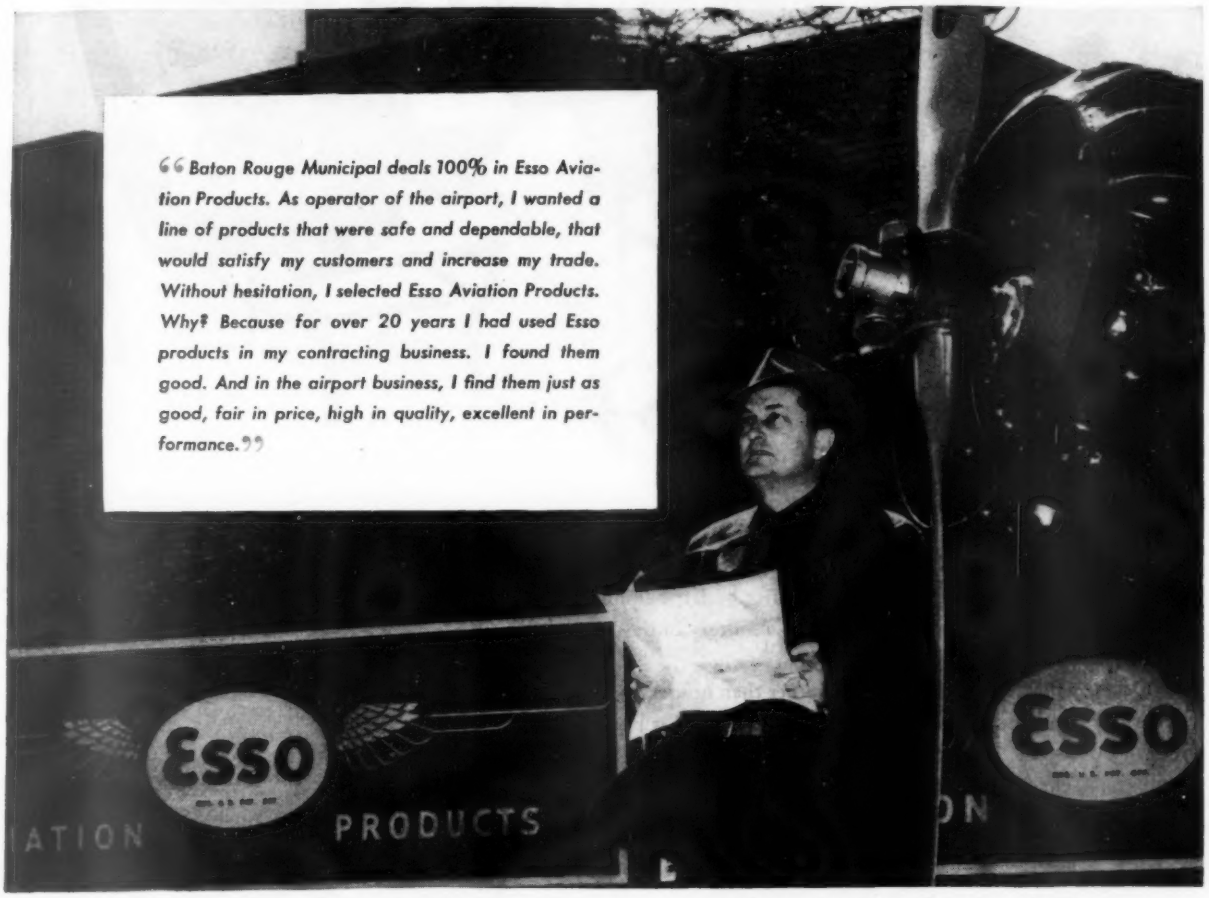
PACEMAKER OF AVIATION PROGRESS—DESIGNERS AND BUILDERS OF THE AIRACOBRA, KINGCOBRA AND AMERICA'S FIRST JET FIGHTER—AIRACOMET

ADV. BY N. W. AYER

NO. 7 IN THE SERIES, **FEATURING SOME OF THE 700 ESSO AVIATION DEALERS THROUGHOUT 25 STATES**

"At Baton Rouge it's Esso Products for Safety and Dependability!"

says BILL EBERHART, *operator*



"Baton Rouge Municipal deals 100% in Esso Aviation Products. As operator of the airport, I wanted a line of products that were safe and dependable, that would satisfy my customers and increase my trade. Without hesitation, I selected Esso Aviation Products. Why? Because for over 20 years I had used Esso products in my contracting business. I found them good. And in the airport business, I find them just as good, fair in price, high in quality, excellent in performance."

Bill Eberhart, president of Louisiana Aircraft, operator Municipal Airport, Baton Rouge.

BACKED BY THE WORK of over 2000 research scientists, by over 40 years' aviation experience, Esso Aviation Products are tried and proved. We fueled the Wright Brothers' first flight at Kitty Hawk in 1903 and today supply many of the major airlines and thousands of private fliers. Over 700 satisfied Esso Aviation Dealers between Maine and Texas are proof of the quality of Esso products and Esso service.

MR. AIRCRAFT OWNER: We suggest you tear off this list and put it in your map case for ready reference on trips throughout Louisiana: Herman Myers Airport, MacArthur Drive Airpark, Alexandria; Louisiana Aircraft," Municipal Airport, Baton Rouge; Brownie Air Service, Bogalusa Airport; DeQuincy Airport; Jack Mashburn Airport, Hammond; Hodge Airport; Ziegler Flying Service, Jennings Airport; New Iberia Airport; Chapman Air Service, Prewitt Aircraft Sales, New Orleans Airport; Weir and Lynch, Opelousas Airport; Municipal Airport, Stovall Airport, Shreveport.

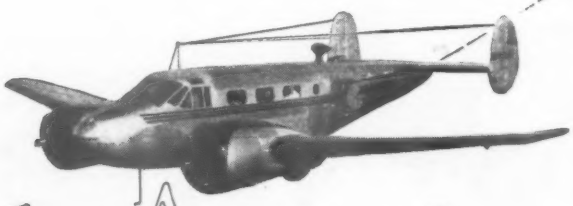
In a comfortable hurry — *at 200 mph*

Travel time can be productive time for the executive who owns or flies in a Beechcraft Model 18. Your unfinished problems need not be left behind in the office; they can be considered calmly while your Beechcraft smoothly carries you at 200 miles an hour toward your next engagement.

Miles become measured in minutes rather than hours. An 800 mile trip as part of a normal day is practical, not unthinkable, and you find it possible to make more "on the spot" decisions. Your travel is correlated with your work, rather than dependent on the rigid schedules of other transportation methods.

At the end of a busy day in which your Beechcraft complements your other modern business equipment, you are still relaxed, and ready to join your friends for an evening of entertainment.

Write today—Facts, figures, and demonstrations are available without obligation.



Beech Aircraft

THE WORLD IS SMALL WHEN YOU FLY A BEECHCRAFT

CORPORATION
WICHITA, KANSAS, U. S. A.

Flight Training and the GI Bill

By L. S. WILLIS

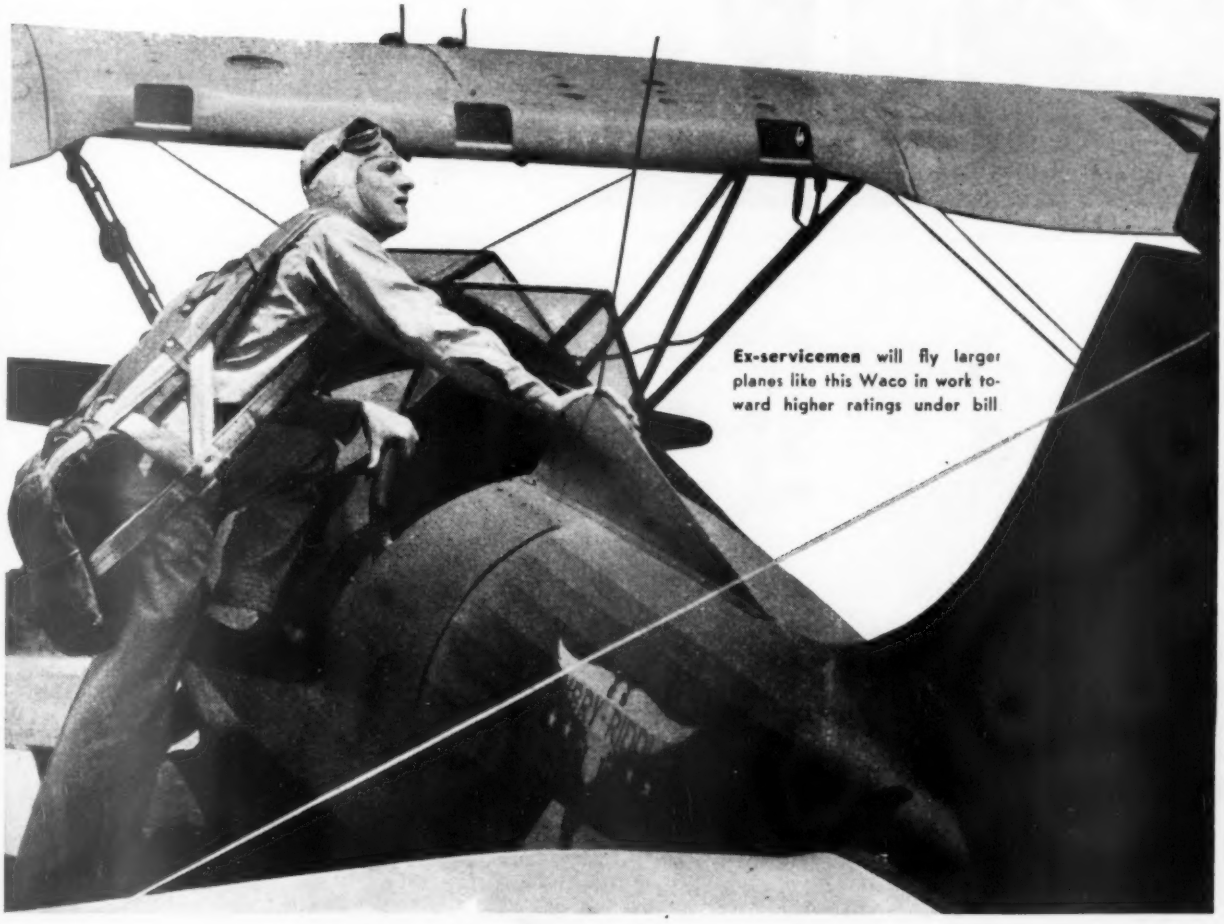
WITH 12,000,000 World War II veterans eligible to become pilots at Government expense, flight training within the next few years could easily dwarf the combined pilot-training program of the Army and Navy which graduated 200,000 pilots during the war.

An amendment to the GI Bill of Rights has made this possible; every discharged veteran is eligible to use his educational benefits for pilot training if he so desires.

"The potential impact of this program is so staggering, that the aviation industry is having trouble grasping the facts," says James W. Batchelor of the United Pilots and Mechanics Association. "A conservative estimate is that 10 per cent of the eligible veterans will decide to take some flight training.

"This will mean 1,300,000 new pilots in the next five years . . . it will mean between one and two billion dollars channeled directly into aviation training . . . it will mean tens of thousands of new training planes each year and tens of thousands of airplane mechanics. It will mean construction of hundreds of private airports scattered through every state in the country.

"People ask, 'What will happen when the program ends?' That depends on whether private flying becomes an everyday necessity or remains an expensive sport. It may depend on development of a cheap, roadable



Ex-servicemen will fly larger planes like this Waco in work toward higher ratings under bill

airplane in the next five years. It may depend on hundreds of practical, close-to-town airports being built.

"One thing is sure—this program will give private flying its greatest opportunity to prove itself. In five years private flying either will fall by the wayside or take what we hope will be its rightful place as a major American industry."

Wayne Weishaar, secretary of the more conservative Aeronautical Training Society, likewise estimates that "more than 10 per cent" of all veterans eventually will take some flight training. He points out that the Veterans Administration expects that 16,000,000 veterans eventually will be eligible for flight benefits—thus the number of pilots trained under the program could exceed 1,600,000.

The veterans themselves are just beginning to realize that they can have up to $3,000 worth of flying time in place of classroom education. This is enough money for a commercial license plus either an instrument rating or an instructor's rating. In many localities it is enough for all three.

Veterans can figure roughly their entitlement (benefit) for flight training by multiplying their days of service by $2.10 and adding to that sum $760.60 for the extra year of entitlement given by the Government. A maximum of $3,000 can be granted under the GI Bill.

In addition to having their tuition paid, veterans attending school a minimum of 25 hours a week can collect subsistence allowances of $65 a month if single and $95 a month if married. If a veteran attends school 18 or more hours a week, he is entitled to three-fourths of his subsistence; if more than 12 hours he is allowed half; and six hours, a fourth. Students may hold jobs earning any amount and still draw subsistence but they cannot work over 39 hours a week. For subsistence purposes, flying time counts double with each hour of air time counting as two ground school hours.

Until recently, the Government assumed that an hourly charge by the school operator of $8.50 solo, $11.50 dual and 75 cents for ground school was "fair and reasonable," for planes up to 125 h. p. If the school's charges exceeded that amount, the school then proved that their rates were "fair and reasonable." This was done by a formula by which a return on investment of up to 10 per cent was permitted based on the costs and profits of the previous year's operations. However, all contracts were to have been renegotiated on June 30.

Flight training costs vary widely in different sections of the country. Roughly, however, average costs, including some ground school, are as follows: private license, $475; commercial license, $1,800; instructor rating, $425; instrument rating, $600.

To get educational training of any kind, the veteran first fills out Veterans Administration Form No. 1950, available at most veterans' posts and guidance agencies. He sends this, together with a copy of his discharge, to the Veterans Administration Regional Office in his state.

In a few days he should receive written notice that he has applied for educational benefits. In some cases he can take this notification to the nearest flight school, sign Form 1950A, and be in the air with an instructor the same day.

Eventually, the veteran will receive a "Certificate of Eligibility" showing exactly the number of calendar years of education to which he is entitled, depending on his length of service. The maximum is four calendar years. Some schools require the certificate itself before the student can start training. In any case, the veteran must sign the 1950A form for any course, such as flight training, in which the tuition is at a rate higher than $500 per school year. The schools themselves usually provide the 1950A forms.

In a FLYING survey of airports in the Chicago area, it was found that nearly 60 per cent of the persons taking flight training at airports giving courses under the GI Bill are ex-servicemen flying at the Government's expense. However, not all airports in the Chicago area are now training under the GI program. Some are staying clear, as they explain, until the program "settles down and the issues are made more clear to us."

Operators training under the program are optimistic and say that they would increase the number of students if they could get more new airplanes. As one expressed it, "now, however, I can't afford to take on any more ex-service men for I would then be unable to provide planes for my regular customers."

The amendment to the "GI Bill" which permits expensive courses such as pilot training became effective last December 28. It was several weeks before many people in the aviation field realized its implications.

As the significance of the measure dawned, there were a few scattered "Hurrah, boys, let's hop on the gravy train" reactions. But responsible men everywhere, including those in the business of giving flight training, have expressed concern over certain long-range phases of

(*Continued on page* 102)

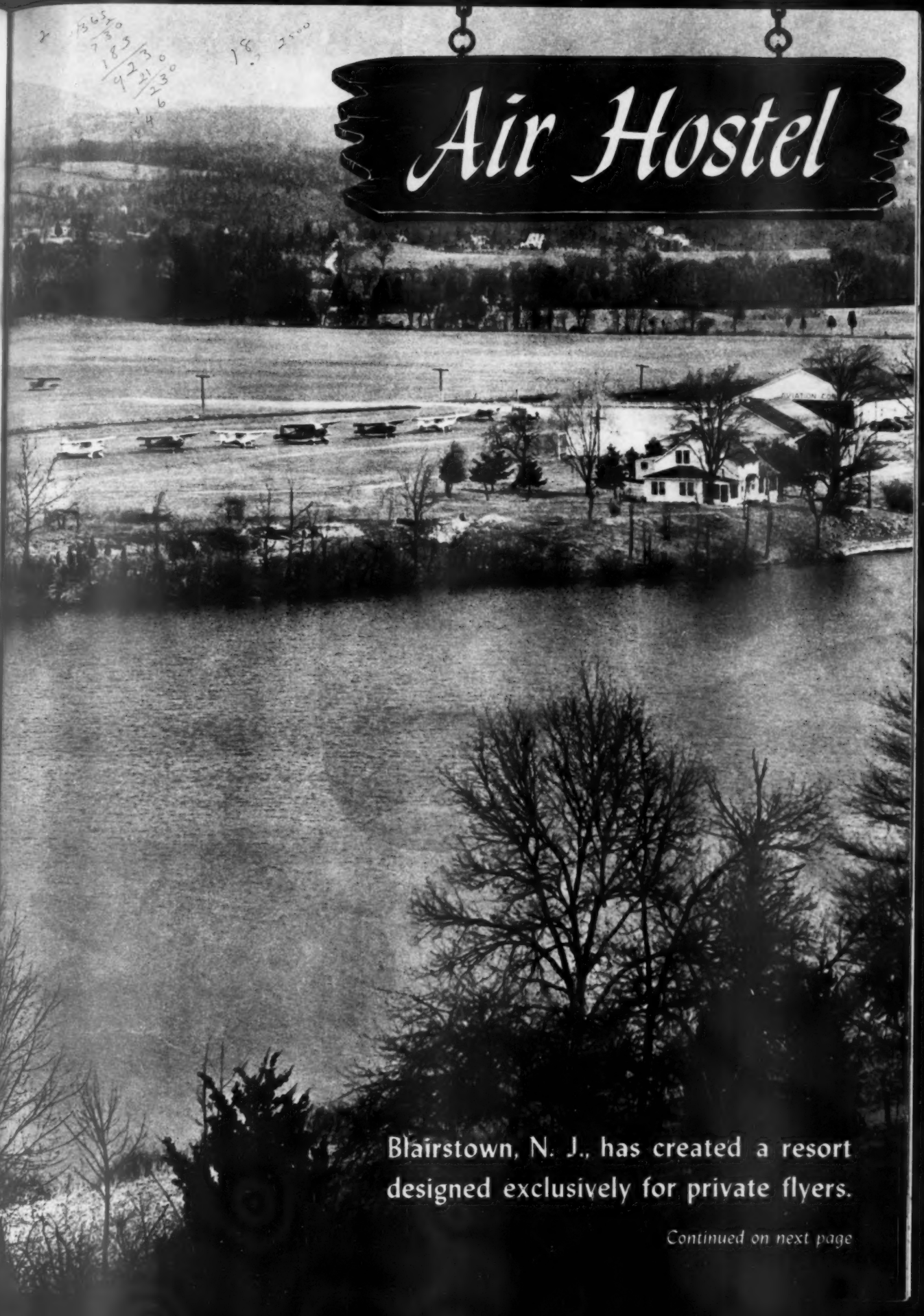
ENROLLING UNDER THE GI BILL IS EASY

Ex-Sailor John Wick shows his discharge papers to Veterans Administration contact worker, asks for a letter of eligibility.

Discussing courses with Elmhurst (Illinois) Airport Manager Fred Arens, Wick and ex-WAVE Bernice Conley decide to sign up.

Training begins same day with Instructor Frank Kriete explaining to his students major parts of the lightplanes used at school.

First flight in plane introduces Bernice to basic operation of controls. The State of Illinois approved school for GI classes.



Blairstown, N. J., has created a resort designed exclusively for private flyers.

Continued on next page

BUSINESS is booming in Blairstown, N. J., and much of the credit belongs to the Lake Susquehanna Airport. Its operators found that the way to sell a fellow flight time is to see that he gets a lot of other things as well—things like good food, recreation, friendly and moderately-priced service.

This business-wise foresight is best evidenced in the choice of the airport site. Lake Susquehanna port is only 55 minutes by lightplane and 1½ hours by rail from the heart of metropolitan New York City. What's more important, it is located right in the heart of a popular resort area.

Almost at the ends of the runways one can enjoy a year-round sports program ranging from tennis, fishing and golf to skiing, skating and hunting. Rocco's "Sunset Villa," a modern resort hostelry located a stone's throw from the airport, gives special attention to flying guests, even offering

Mapping a cross-country hop, instructor points out scenic areas near Susquehanna which student may visit.

reduced rates to groups of flyers. Its owner-manager and other Blairstown businessmen are in constant collaboration with Susquehanna operators to see that flyers get the best the area has to offer. The airport and its flying school set the pace in this service effort, but everyone profits.

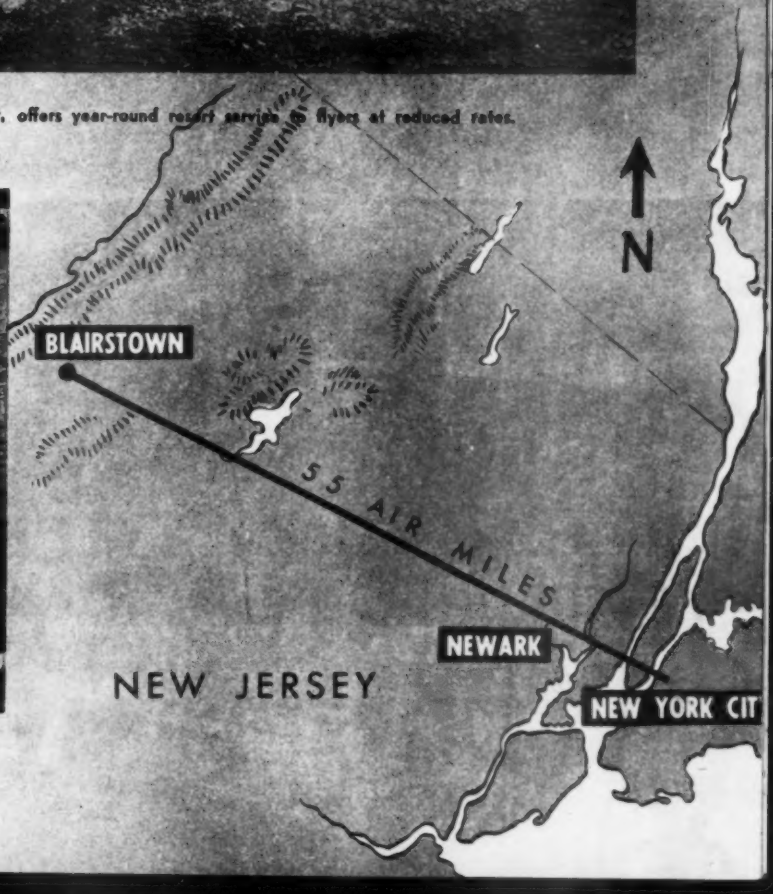
When Frank Pittenger, Harold Wolfinger, John Rothbauer and Helen Barrick incorporated themselves as the Aviation Schools and Service and set up shop on the shores of Lake Susquehanna, they already had plenty to offer their prospective customers. Pittenger and Wolfinger had just completed a stint as Army flight instructors. Rothbauer had been hangar chief at the Mobile, Ala., glider school. Miss Barrick was a ferry pilot and held a B.S. degree in education.

Pooling these talents (and adding to them through spe-

Vacationists can add full round of sports to week-end flying.

Villa Sunset, overlooking Lake Susquehanna and its airport, offers year-round resort service to flyers at reduced rates.

Fishing begins at runway edge. Lake can land seaplanes.



SUSQUEHANNA SELLS SERVICE TO ITS STUDENTS

1 **Transportation** to and from airport is provided for student pilots who come to Blairstown by rail.

2 **Name tags** on bulletin board mark flight schedule arranged for each student by his instructor.

3 **Basic courses** are taught in well-equipped classroom by a CAA-licensed ground school instructor.

4 **Approval** of his private-license check flight is signed for student by CAA-certified instructor.

Repair shop offers clean, efficient service at standard rates. Note fireproof drop curtain used to enclose paint operations.

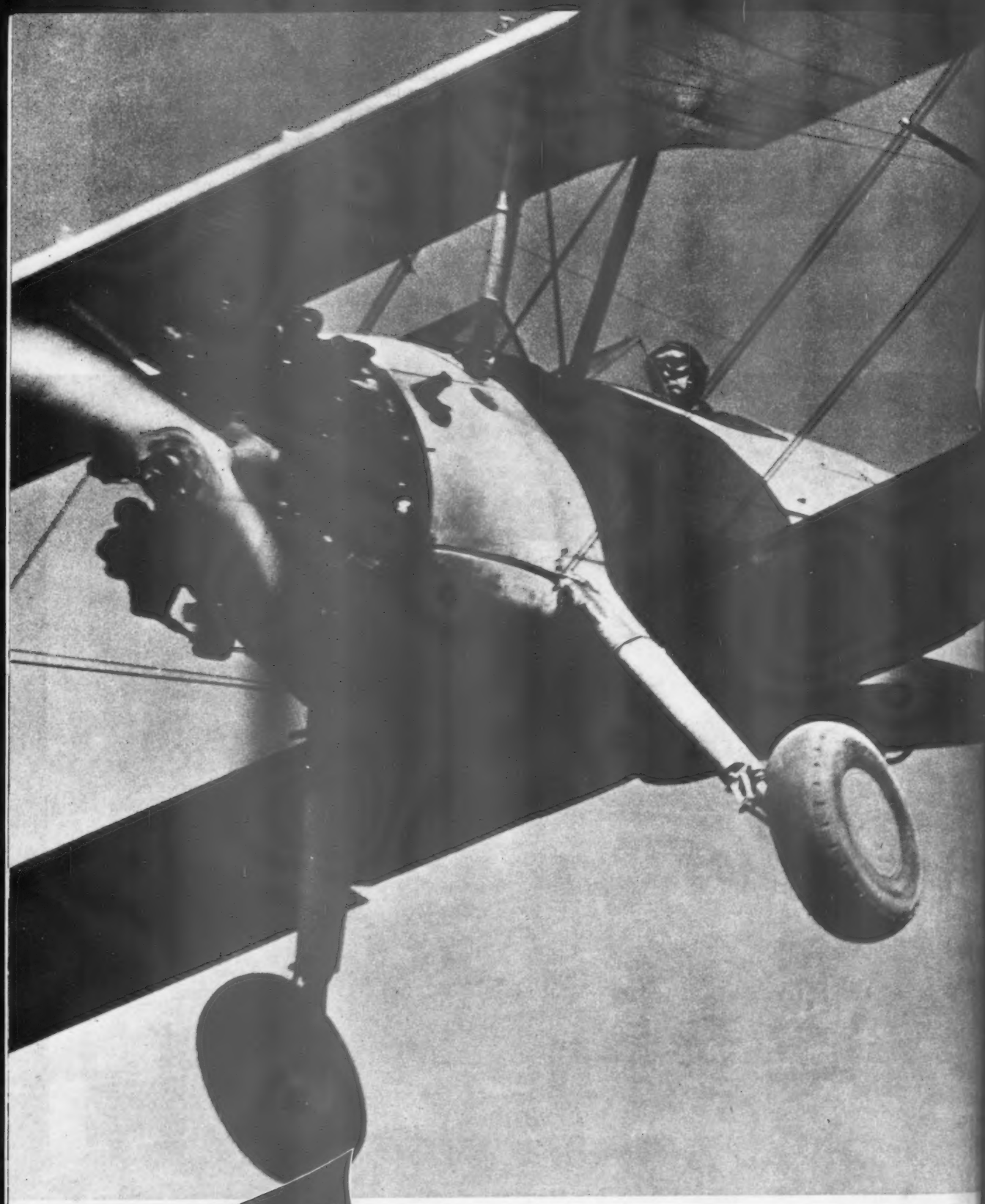
cialized training) the group won for its school the most complete CAA certification in the state—it was the first in the state to be approved by the Veteran's Administration to give aviation training under the G. I. Bill of Rights. It offers ground-school students courses leading to an A&E rating; flight students may acquire either a private or commercial license, and courses leading to instructor's and instrument ratings are offered.

Ground school classes are conducted in well-equipped classrooms. There are full-scale cutaways of lightplane engines, wing sections and fuselages. Blairstown's location, near the foot of the Kittatinny Mountains and their famous Delaware Water Gap, provides experienced flyers a choice of scenic cross-country trips. And there are plenty of level upland plateaus for student-pilot practice areas.

Susquehanna prices for service and flight training have been kept at a reasonable level. Dual is $10 per hour, solo $8, in the school's Aeronca trainers. Rates on larger craft are scaled accordingly. Block time may be purchased at 10 per cent discount. Link Trainer instruction is $8 per hour. Tie-down costs are 50 cents a night, T-hangars rent for $15 a month. Shop service is efficient; rates are standard.

Briefly, that's the story of Blairstown's successful Air Hostel—efficient service and skilled instruction, with a lot of vacation extras tossed in for good measure. END

Camaraderie of instructors and efforts of airport employees to give real service are reasons for Susquehanna's success.



the MONTH'S BEST

Solo

Cygnet

Britain's Lightplanes

MILES MAGISTER is a two-place open-cockpit trainer which was flying before the war, has top speed of about 145 m.p.h.

Compiled by
Maj. OLIVER STEWART
and Sq. Ldr. D. WEST

JUST as with the U. S., Britain's current personal planes are almost entirely little-changed versions of pre-war models Unlike the U. S., however, they are not in substantial production. There is comparatively little market for such planes in the British Isles; income taxes are so high that only the very wealthy can afford them. Therefore, nine of the 15 planes listed have been used primarily as military training or liaison aircraft which can be adapted to personal use. Only six were developed primarily as personal planes: the Miles 48, General Aircraft *Cygnet*, Tipsy, A. V. Roe *Avian*, Chilton *Monoplane*, and the Chrislea *Ace*. A seventh—a personal version of the military Percival *Proctor IV*, called the *Proctor V*—is being developed. Only four of the planes listed here and on the next two pages are new: the *Desford*, the Percival Trainer, the Miles 48, and the unconventional Chrislea *Ace*.

CONTINUED ON FOLLOWING PAGES

MILES GEMINI (see page 43, July FLYING) is being developed as a personal plane, light freighter, and taxi ambulance.

← **GENERAL AIRCRAFT CYGNET** is attractive lightplane which flew in 1939, is not yet in production.

MILES MESSENGER has phenomenal stalling speed of 28 m.p.h. and can take off in 60 yards. It carries three or four.

CURRENT BRITISH PERSONAL AIRCRAFT

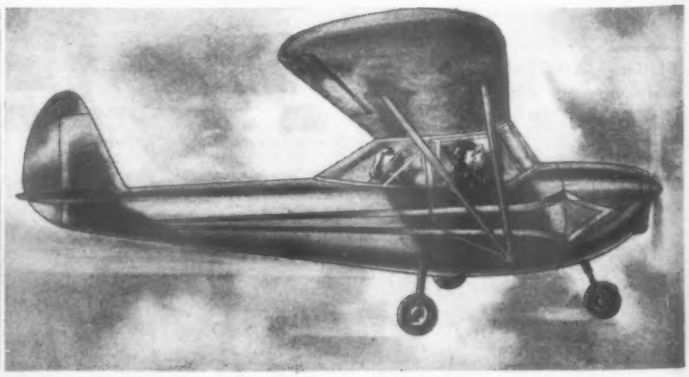
Manufacturer	Popular Name	Engines	Horse-power	Wing Span	Length	Gross Weight (lbs.)	Empty Weight *lbs.	Wing Loading (lb./sq. ft.)	Normal Fuel (gal.)	Number Places	Max. Speed (m.p.h.)	Cruising Speed (m.p.h.)	Stalling Speed (m.p.h.)	Range (miles)	Service Ceiling (feet)	Rate of Climb at SL (ft/min.)
Auster	Auster V	Lycoming	130	36'0"	22 5"	1,920	1,050	9.87	15	3	130	112	38*	220	15,100	800
Chilton	Monoplane	Carden	32	24'0"	17'6"	700	398	8.2	10	1	112	100/103	.....	500	.....	650
Chrislea	Ace	Monaco	100	36'0"	20'2"	1,650	850	10.7	17	4	127	120	32	390	.....	1,450
De Havilland	Tiger Moth	Gipsy Major	130	29'4"	23'11"	1,825	1,115	7.6	19	2	109	89	43	285	13,600	673
Gen. Aircraft	Cygnet	Gipsy Major	130	34'6"	23'3"	2,100	1,455	11.7	27	2	130	110	.....	460	14,000	700
Miles	Gemini	2 Cirrus Minor	100	36'2"	22'3"	3,000	1,773	15.7	36	4	150	130	35	520	.....	870
Miles	Magister	Gipsy Major	130	33'10"	25'3"	1,825	1.240	10.3	22	2	145	.....	45	.....	18,000	.....
Miles	Messenger	Gipsy Major	140	36'2"	23'9"	2,400	1,360	12.6	36	3 or 4	120	112	28	500	17,000	1,100
Miles	M 48	Cirrus Major	150	36'2"	23'9"	2,400	1,500	12.6	18	3 or 4	...	115	25	250	.....	1,100
Moss Brothers	Mosscraft	Cirrus Minor	90	34'0"	23'3"	1,400	800	9.10	21	2	120	105	42	400	16,000	850
Percival	Proctor IV	Gipsy Queen II	208	39'6"	28'2"	3,500	2.370	17.3	40	3 or 4	160	135	55**	500	14,000	700
Percival	Trainer	Gipsy Queen	250	46'0"	31'3"	3,775	2,815	12.4	40	3	155	143	61.8*	464†	18,000	890
Reid & Sigrist	Desford	2 Gipsy Major	130	34'0"	25'5"	3,300	2,477	17.75	44	2	162	148	70*	463	17,730	1,100
A. V. Roe	Avian	Genet Major	100	28'0"	24'3"	1,600	1,000	6.9	24	2	100/105	90	.....	400	.....	.....
Tipsy Aircraft	Tipsy	Walter Mikron	62	31'2"	22'0"	1,200	666	9.3	12	2	110	100	35	300	15,000	500

*Flaps up *Flaps down †At 138 m. p. h. sea level cruising

TIPSY is a small two-seater which has a 300-mile range at 100 m.p.h. As with the Cygnet, post-war production of the Tipsy has not started.

CHILTON MONOPLANE is a tiny single-seater which weighs only 398 pounds empty, yet cruises at about 100 m.p.h. No post-war plans yet.

AUSTER V was designed as a two-place liaison plane but is now a personal aircraft. The company once was affiliated with U.S. Taylorcraft.



CHRISLEA ACE (see page 44 of July FLYING) is an unorthodox plane which has no foot pedals. Controls are actuated solely by the hand wheel.

	Rate of Climb at SL (ft/min.)
0	800
.	650
.	1,450
0	673
0	700
.	870
0	.....
0	1,100
.	1,100
0	850
0	700
0	890
0	1,100
.	.....
0	500

PERCIVAL PROCTOR IV is a four- or five-place military trainer. A revised version, the Proctor V, is being manufactured as a personal aircraft.

MOSSCRAFT TRAINER is another British craft flying in 1939 for which no post-war plans exist. It cruises at 105 m.p.h. on 90-h.p. Cirrus engine.

PERCIVAL TRAINER is a big new three-place primary trainer with a 250-h.p. engine and cruising speed of 143 m.p.h. It first flew in April

AVRO AVIAN is one of the few biplanes still left in any number in Britain. Despite biplane design, it cruises at 90 m.p.h. on 100-h.p. engine.

DE HAVILLAND TIGER MOTH was extensively used during the war a a primary trainer. It has 130-h.p. Gipsy Major engine, cruises at 89 m.p.h

SHOULD YOU *Own or Rent a Plane?*

Plane economy depends on utilization. Your plane can be cheaper than your car—if you use it enough.

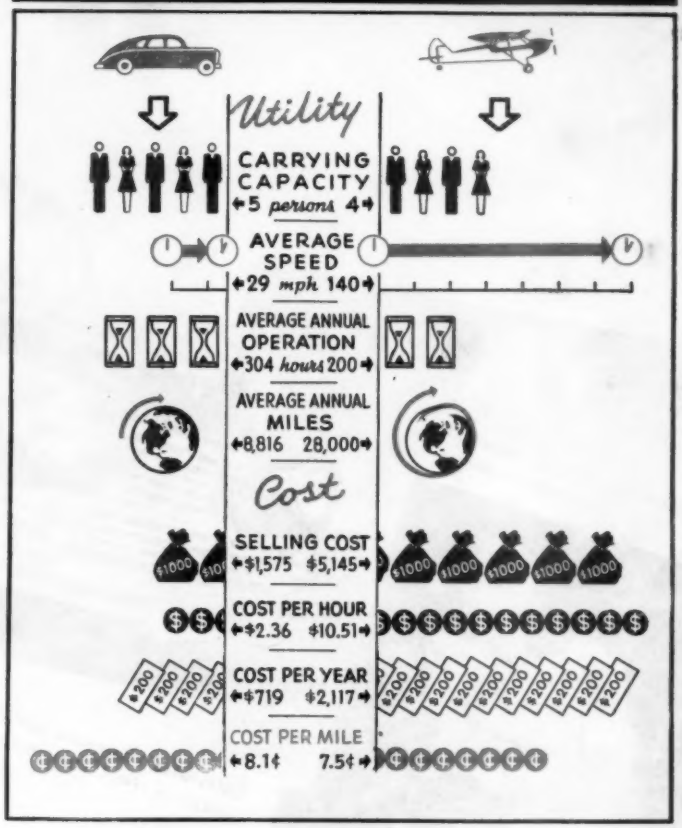
THE personal airplane will produce more miles of travel and more hours of pleasure per dollar invested than any other form of transportation, bar none.

That is the key to its present and future success and it is true even today when its full potential utility is far from realization. But though the return is relatively greater, so is the required investment. This is the story of how much that investment must be. It attempts to tell, among other things, whether you should own, or rent, a plane.

Just what goes to make up operating cost? There are four basic direct costs and one indirect cost. By direct cost is meant the physical removal of a dollar from your pocket. Of the direct costs, two are variable according to the number of hours flown. These are fuel and oil costs, and maintenance costs. The other two are fixed costs—hangar rental and insurance. For personal-plane operation, I call depreciation a fixed indirect cost. The three fixed costs—hangar rental, insurance and depreciation—remain the same whether you fly one hour or 1,000 hours. The more hours you fly, the less these costs are on a per-hour or per-mile basis. The variable costs increase as hours flown increase.

For example, let's take a small two-place plane with 75 h.p., cruising at 110 m.p.h. and costing $2,700. Operating costs would be approximately as follows, including fuel and oil, maintenance,

AUTOMOBILE *vs.* PERSONAL PLANE



parts and overhaul reserve, hangar rental, insurance and depreciation:

Annual Operating Cost:

50 hours per year.....$ 772.00
500 hours per year..... 1,663.00

Cost Per Hour Flown

50 hours per year.....$15.40 per hour
500 hours per year..... 3.32 per hour

Cost Per Mile Flown

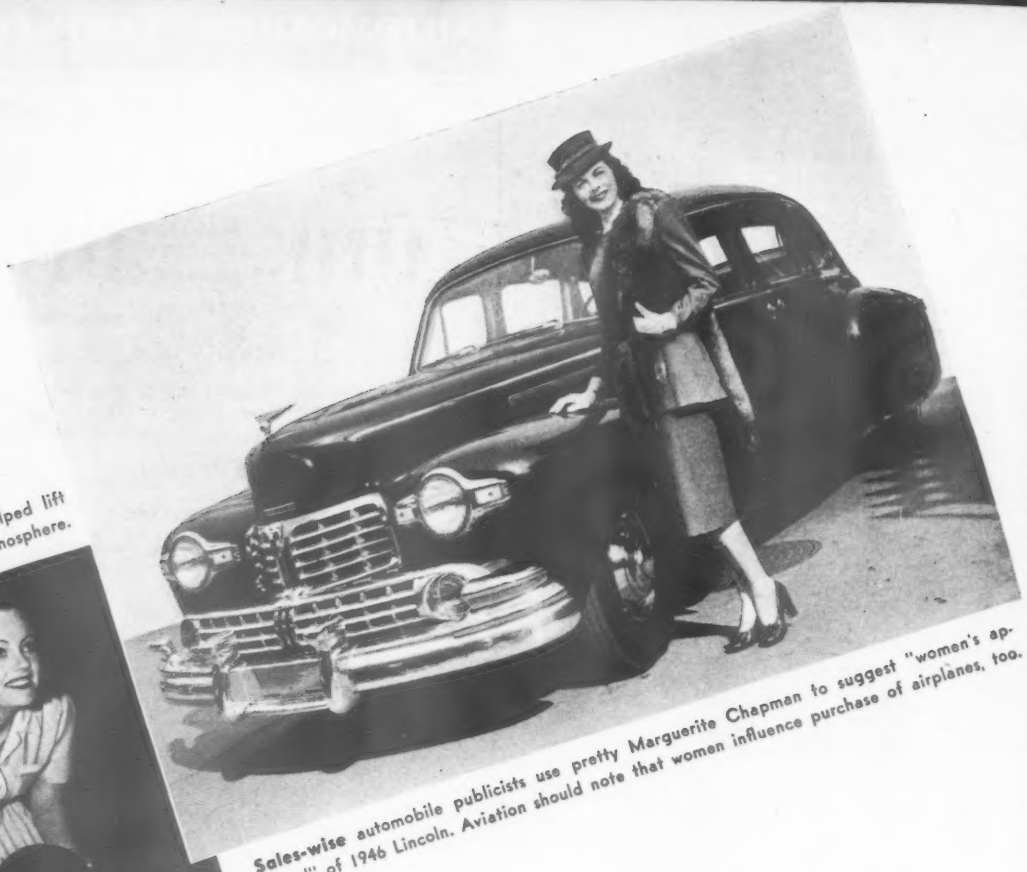
50 hours per year.....13.5 cents/mile
500 hours per year..... 2.9 cents/mile

If you can afford $800 per year you can own and operate a plane like the one above for 50 hours, but at $15 per hour you'd do better to join a flying club or rent one at your local airport for $7 or $8 an hour. You should be able to utilize your plane from 125 to 200 hours to make it pay. The average utilization is (*Continued on page* 64)

By NEIL B. BERBOTH

Staff member of Fairchild Engine and Airplane Corp.'s Development Division, the author is an expert on plane-operating costs.

Family-sized airplane can cost less per mile than a big car.



Sales-wise automobile publicists use pretty Marguerite Chapman to suggest "women's approval" of 1946 Lincoln. Aviation should note that women influence purchase of airplanes, too.

...norous publicity pictures helped lift ...ling out of the pool-room atmosphere.

Smart publicity is needed before flying will become "The-Thing-To-Do" for the thousands of Americans who could own an airplane but don't.

Well-publicized military tests pointed up ruggedness of trucks for post-war market.

THE CHANCE to fly should be the most exciting prospect in the average man's peacetime life. It not only promises freedom from the solid earth but implies new city-planning, a revitalized economy and complete shifting of horizons. Yet, in our newspapers and newsreels, the post-war kitchen and the television receiver are heralded as the wonders of modern living—and to many private flying is still a borderline hobby.

Why? Because the manufacturers of kitchen equipment and television sets are putting expertly-prepared ballyhoo on their products where the public will see it and get excited. They've given glamor to their mass-produced fixtures, while the plane manufacturers haven't even begun to point out the glamor that's bubbling all over the miracle of every-man's flying.

It is safe to say that, properly pro-

Airplane's fun and utility are dramatized in this well-planned setting, but few photographs of this quality are circulated by the major lightplane builders.

Victory gardens were popularized by clever press photos. Actress Angela Lansbury posed for this one.

Rx For Selling Aviation

By PHILIP LESLY

Director of Public Relations, Ziff-Davis Publishing Company, Chicago; co-author of the recent book, "Public Relations: Principles and Procedures."

moted, private flying could duplicate the trend of the automobile after World War I. And it's just as safe to say that, promoted as it is now, it will duplicate the trend of private flying before World War II—a slow, unexciting increase that will relegate it to years of small-time operation.

The answer is not difficult. Flying must be changed in the public mind from a rich man's hobby, a daredevil's sport, an impractical and expensive type of transportation, into The-Thing-To-Do in travel, sport and family transportation.

Achieving this goal is not an idle dream. Similar popularizations have been performed for many other products and activities.

Today, for example, wrist watches for men are taken for granted. But before World War I the wrist watch was considered effeminate and the manufacturers were unable to convert men from pocket watches. During the war, the Army gave many responsible officers wrist watches for convenience in combat. One big watch manufacturer took advantage of this and in advertisements and publicity pictures showed everyone that great warriors wore wrist watches in battle. The stigma of femininity was conquered and an old industry found a huge new market.

It's The-Thing-To-Do to give gifts on Mother's Day; few question it. Yet Mother's Day was started in 1907 by a Philadelphia woman and was a local affair until merchants recognized the opportunity to make a gift occasion of it. It caught on among sales-minded retailers everywhere and has acquired such testimonials of respectability as an international association, recognition by Congress, and (by constant pressure from merchants' groups) a Mother's Day postage stamp in 1934. It is estimated that more than $100,000,000 are spent each year on this one-day observance. In the same way it has been made The-Thing-To-Do to give gifts at Christmas, Easter and Father's Day.

By making any activity The-Thing-To-Do, so common and accepted that everybody does it or aspires to do it, it is possible to make it a "must" for millions. Look at bridge, cocktail parties, movies. The playing card manufacturers took advantage of a mild renewed interest in bridge to make it the established parlor game of all classes for nearly 20 years. The liquor industry made masterful use of publicity techniques when prohibition was repealed to put the touch of respectability on women's drinking, then made the cocktail the drink for social occasions

(*Continued on page 70*)

THE *Ercoupe*

Tricycle gear and two-control system are most often condemned by conventional-plane pilots. Author is in plane.

FLYING's TEST PILOT

EDITOR'S NOTE

This is another in a series of articles designed to help the prospective plane owner evaluate aircraft now on the market. Experimental designs are not covered; only those actually licensed and for sale are featured. While the manufacturer may supply a plane and data, he doesn't control these opinions.

NO ONE ever talks about the *Ercoupe* in calm, dispassionate terms. Pilots and plane owners either are violently pro-*Ercoupe* or they pound tables for hours on end trying to convince you that it is one of the world's most dangerous aircraft. So it is only with the greatest care that one should approach an appraisal of the *Ercoupe*. The inquirer should adopt—and stick to—the frame of mind that permits an honest, open-minded evaluation of this interesting airplane.

There is no question that a mishandled *Ercoupe* will cause less bodily harm to the pilot doing the mishandling than most contemporary lightplane types. As this is written, the Engineering and Research Corporation had produced their 2,073rd *Ercoupe* (including the 112 built before the war). Yet there have been only three fatalities to date: one, in a pre-war model, in which a passenger died from injuries suffered when the plane was accidentally flown into some trees. The other two fatalities occurred recently when two experienced pilots flew into a Texas hill while trying to fly cross-country in zero-zero weather. It is significant that *Ercoupe* insurance is approximately 25 per cent less expensive than standard lightplane insurance.

The *Ercoupe*, then, is a safer-than-average airplane, whispering campaigns to the contrary. It is certified spin-proof by the CAA, although there are "anti" pilots who are willing to bet all comers that they can spin one. Any pilot making such a bet should be asked to define what he means by "spin." The *Ercoupe* can be flown into a steep, nose-down power spiral. It must be held in that attitude and it builds up speed constantly. But the airplane is *always* under complete control and can be returned to level flight at any time the pilot chooses. This, of course, is not entirely possible in a spin in a conventional airplane. So what the "anti" pilot calls a spin is nothing more than an intentional spiral; control of the *Ercoupe* in this maneuver never is lost.

Biggest tempest in the *Ercoupe* teapot is the cross-wind landing. Because the airplane is two-control, the pilot cannot operate the rudders independently. That means, of course, that the plane can't be (*Continued on page* 78)

A POPULAR PRE-WAR LIGHTPLANE RETURN

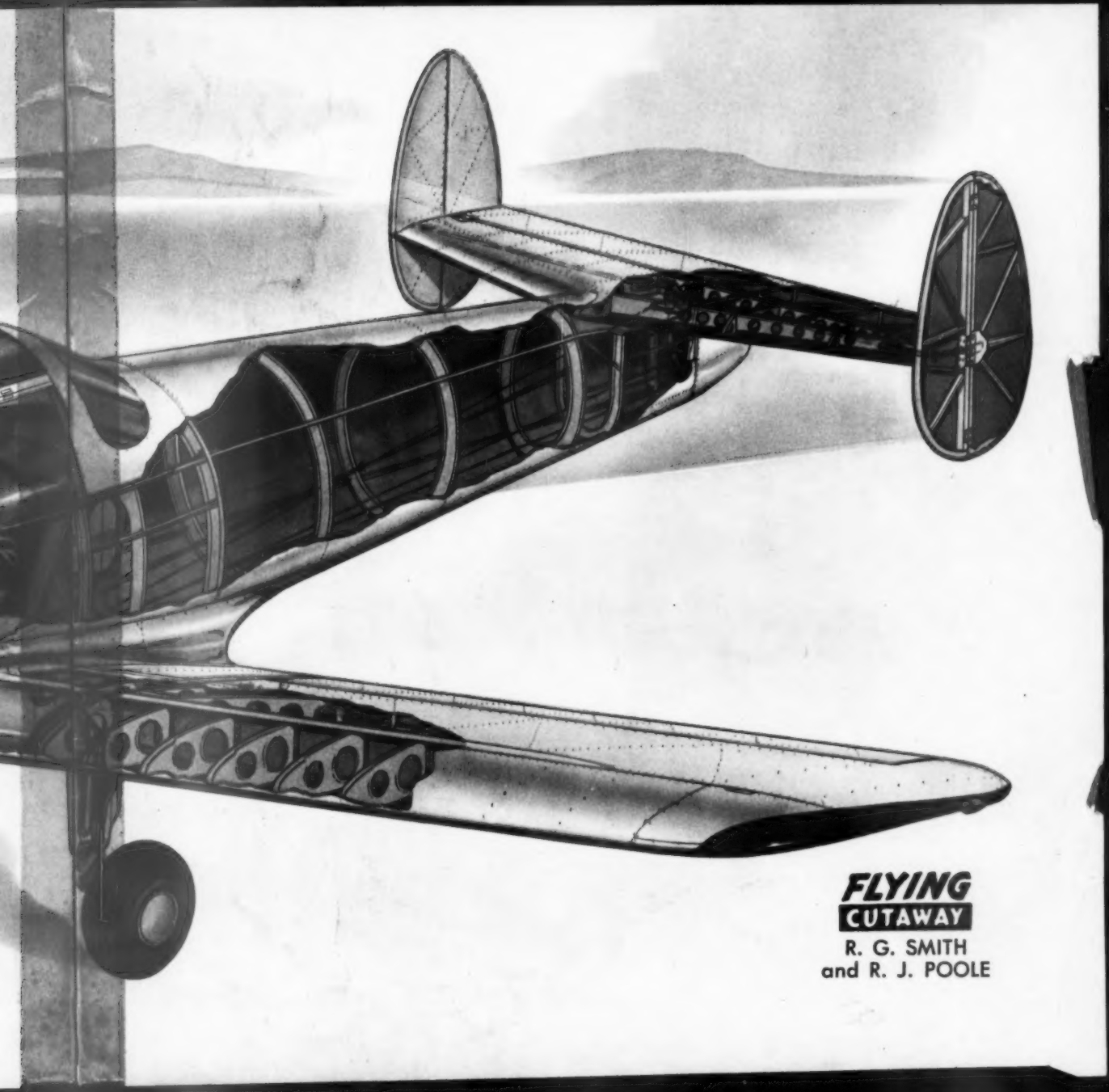
The ERCOUPE

One 75-h.p. Continental engine

WING SPAN: 30 feet
LENGTH: 20 ft. 9 in.
HEIGHT: 5 ft. 11 in.
GROSS WEIGHT: 1,260 pounds
EMPTY WEIGHT: 750 pounds
TOP SPEED: 127 m.p.h.
CRUISING SPEED: 110 m.p.h.
STALLING SPEED: 48 m.p.h.
MAXIMUM RANGE: 500 miles
SERVICE CEILING: 14,000 feet

Source: Engineering & Research Corp.

NS WITH LARGER ENGINE, MUFFLER, AND STARTER



FLYING
CUTAWAY

R. G. SMITH
and R. J. POOLE

AIRPORT SHUTTLE
TELEVISION BROADCASTING

SUBURBAN AIR MAIL

Contracts already are being drawn up by the Post Office Department enabling large cities to use suburban helicopter air mail service. This and other highly specialized tasks shown here indicate the present limits in use of the helicopter.

How much is true about the Helicopter?

By PAUL FOUNTAIN

Associate Editor of FLYING

SO MUCH fiction has been mixed with so little fact in reports on the helicopter that even the experts are a bit confused. Such pseudo-scientific razzle-dazzle is creating an unfortunate situation for an aviation industry already hard-pressed to keep its promises to potential aircraft purchasers.

No less than a dozen books and some 30 magazine articles have been written about 'copters during the past few months. Buried somewhere in this pile of helicopter hokum are the few essential facts—facts which are not at all conducive to a starry-eyed belief that owning a 'copter, like owning a 1946 auto, is only a few months away. But that's precisely the sort of belief that popular writers have succeeded in creating.

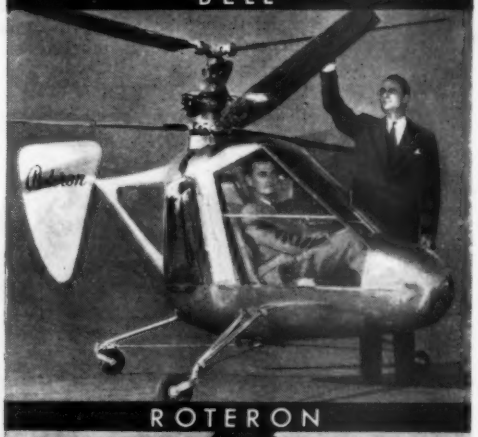
Stripped of fiction, the facts about what the helicopter actually can do are exciting enough. The more important of these tasks are illustrated on the accompanying gatefold (at left). Some are already routine jobs for the helicopter and, if plans that have actually reached the contract stage are an indication, all of them will be routine in the immediate future—regardless of whether any further development of the 'copter is ever achieved.

But these illustrations also should indicate present limits on the use of the helicopter. Note that they are highly specialized services sponsored by the Government or by big business. The reason for this is that only such interests can afford the current cost of a 'copter. Since both Bell and Sikorsky have been granted CAA licenses on helicopters, it's possible if you're not too far down the list, that you can buy a 'copter within a year or so. But the price will not be less than $10,000—it will probably be nearer $50,000.

Check the helicopter types shown at the right. They represent some of the better experimentation toward eventually meeting the private owner's needs. Yet only one of the 'copters shown in this panel has been granted a CAA license and it is being subjected to constant experimentation and change. All these types will remain beyond the private pilot's means until such experimentation makes it fairly certain that expenditures necessary to mass production are a safe gamble. Mass production depends upon mass demand and mass helicopter demand at present is for a product that doesn't yet exist—except as an overzealous hypothesis of the writers. (*Continued on page* 100)

HILLER-COPTER

BELL



ROTERON

KELLETT

LET'S FLY UP TO *Canada*

By JAMES MONTAGNES

LET YOUR DREAMS about that aerial vacation run riot. Imagine yourself choosing from day to day whether you'll spend it at an exclusive resort or in the heart of a primeval wilderness, whether you'll play badminton or shoot grizzlies. Like the idea? Then let's fly up to Canada.

About the only limits on a Canadian air tour will be those imposed by your own flying equipment. There are plenty of interesting places you can visit in a conventional lightplane. But if you have a set of floats, or if your plane is an amphibian, your range of selection is increased immeasurably, for Canada is a land of lakes. But before we point out some of the many things you can do, perhaps it's best to clear away some routine matters — things like customs inspections and foreign flying permits.

Canada welcomes tourists with a minimum amount of border regulations and delay. Permanent residents of the United States are not required to have passports, though decision regarding this qualification rests with the examining officer. Necessary formalities at a port of entry ordinarily take but a few minutes.

Customs authorities prefer that American aircraft make their first landing in Canada at one of the 101 airports licensed as ports of entry (for a listing of these ports see page 84). But because these ports quite often are very widely separated, it is permissible for a foreign plane to land at any point in the Dominion where there is a customs office.

If you choose to land at some spot other than a licensed port, you'll be expected to furnish the customs office at that point with some advance information—your probable time of arrival and full information as to your plane's markings and numbers. Since the customs office at these points may be some distance from the spot where you land, you'll have to pay the minor expense involved in detailing an official to check you and your plane into the country.

Wherever you land, the examining official will want to see your plane's certificate of airworthiness and your pilot's certificate and log book. As a matter of fact, you should be ready to produce these at any time. not only for customs inspectors but for representatives of the Ministry of Transport or members of the Royal Canadian Mounted Police. The customs official may ask you a few questions about the purpose and probable length of your visit while he's filling out your permit (Form C15) to fly in the Dominion. He'll ask you to fill out in triplicate a declaration covering the vacation equipment and supplies you're carrying, and you'll have to show a copy of the statement at the out port when you leave the country. If you are a hunter, you'll need to get a permit for your guns.

That's about all there is to it—no real bother or delay, no "bite." Of course you'll be expected to ob-

Fishing and hunting in Canada's wilderness is best reached by seaplane or amphibian.

Canadian resorts expect an increase in flying tourists. Many, like hotel at Ste. Agathe des Mont (left), provide service for airplanes. Man (inset) is netting 10-pound salmon caught in Salmon River, Que. Noorduyn Norseman (below) is a bush country freighter, flies sportsmen to remote hunting and fishing areas.

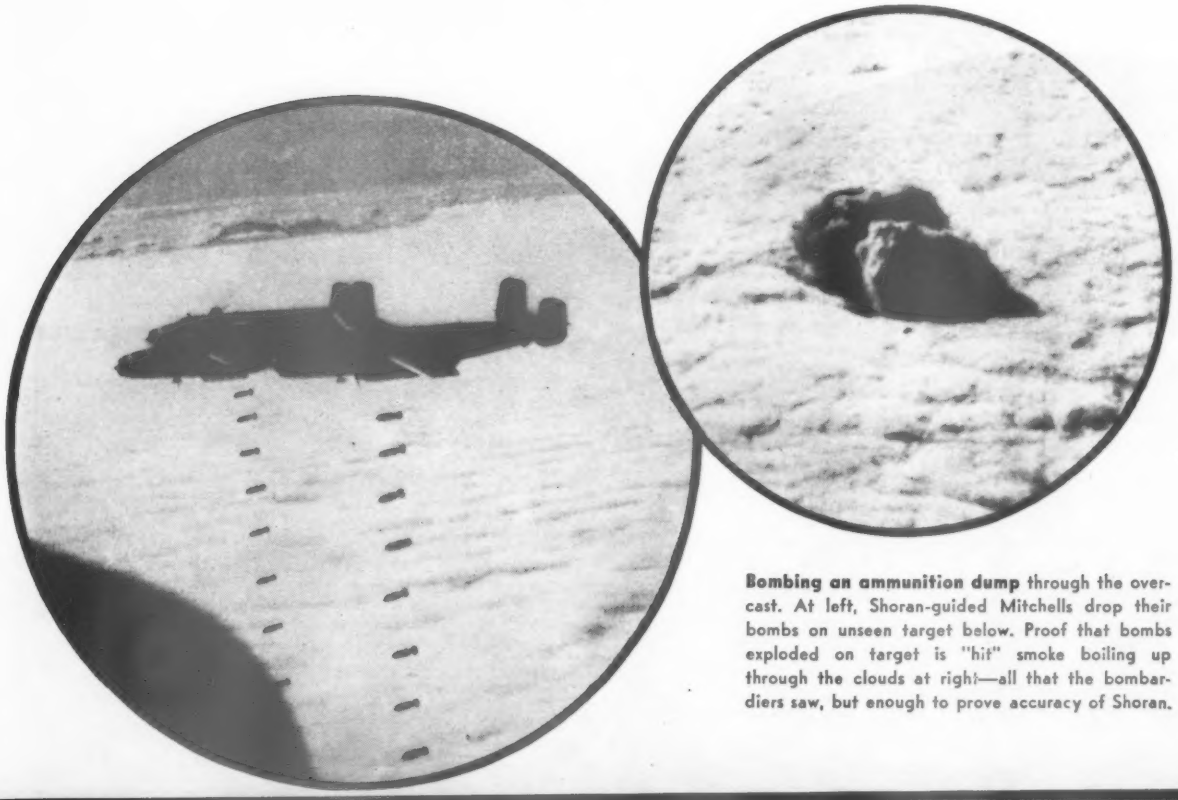
serve general flight rules but they are pretty much the same as the ones you've been used to in the States—your plane must display NC registration markings and you must file a flight plan for each flight along an established airway—rules like that.

The only additional rules are those devised to protect the more adventurous sort of aerial tourist. Flights can't be made into sparsely settled areas, for instance, unless certain emergency equipment is carried aboard the aircraft. This means that plane load capacity must be checked carefully. The basic emergency equipment requirements include not less than five pounds of concentrated food (or the equivalent in ordinary foods) per person, (*Continued on page* 84)

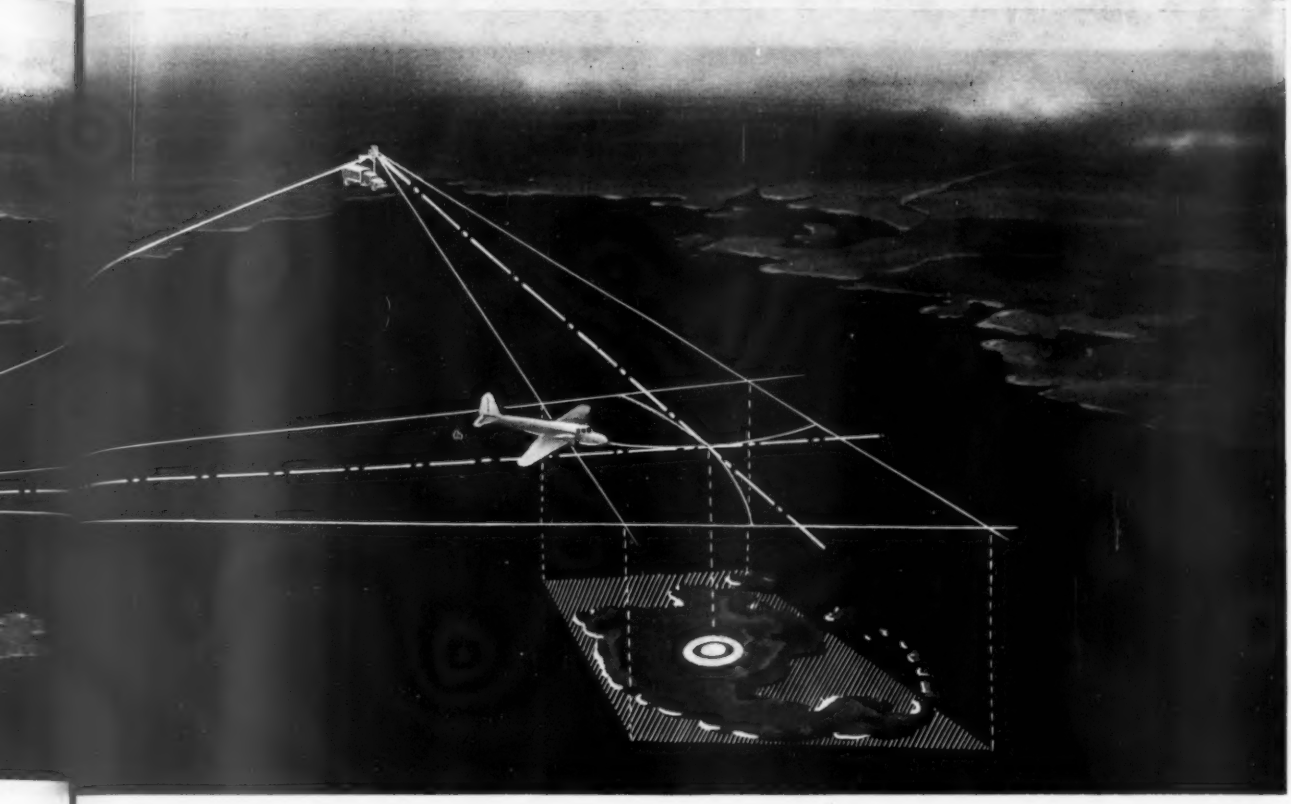
SHORAN GUIDES A BOMBER

Shoran performed at least three major wartime services for U. S. aircraft: (1) It guided bombers on blind-flying missions and determined exactly where their bombs would be released; (2) it guided aircraft on precise aerial mapping missions, and (3) it performed ordinary navigation services. Diagram, right, shows Shoran setup for typical blind-bombing mission. The plane flies a pre-determined circle around one station to home on the target, and the bombs are released exactly at the predetermined point on intersecting the beam from the other station. Up to 20 aircraft may use one pair of beacons simultaneously. Without relocating portable stations, they may drop bombs independently on any desired target if it is within the shaded area of the diagram.

The Magic Mariner



Bombing an ammunition dump through the overcast. At left, Shoran-guided Mitchells drop their bombs on unseen target below. Proof that bombs exploded on target is "hit" smoke boiling up through the clouds at right—all that the bombardiers saw, but enough to prove accuracy of Shoran.



Shoran is a radar navigation development which guides aircraft to within 50-foot accuracy at 300-mile ranges.

By DOUGLAS J. INGELLS

OFF THE coast of Florida specially-equipped airplanes are using a once-secret war weapon in its first practical peacetime demonstration. Fitted with Shoran radar navigation systems, they are patrolling the newly-acquired Continental Shelf regions and helping to chart exact locations of rich oil and mineral fields that some day will add their wealth to Uncle Sam's treasure of natural resources.

Inside the planes, delicate instruments that can detect the presence of oil and mineral deposits on the undersea bottoms tell observers when they are flying over potential riches. By matching two quivering pulses on a cathode-ray tube that is part of the Shoran equipment, these men can tell instantly the exact position of the airplane in the sky. Hence, it is simple to pin-point the spots on the charts where test holes should be drilled to determine the depth, quality and quantity of mineral deposits.

Shoran, which has been veiled in secrecy, suddenly has become one of the most important of all wartime developments. It contributed to the outstanding accuracy for our precision bombing methods—even through overcast—during the war. It has proved to be a boon to aerial photographers—enabling planes to fly with unfailing accuracy over predetermined straight-line courses which heretofore depended entirely upon pilot skill. And now it looms with growing importance as a means for insuring hits on far-off targets with pilotless, radio-controlled rocket bombs in the age of "push-button" warfare—if that day should ever come. Although it is far too complicated and expensive in its present state for use in personal planes, Shoran someday may enable you to fly almost anywhere in fog or fair weather and never get lost. A glance at the radar scope beside you will indicate instantly your exact position in the sky relative on a map to a water tower, a river, a railroad or an airport below. But right now, the experts claim, Shoran is limited to larger aircraft.

Shoran is a type of radar for position-finding in aerial navigation. It is installed in an airplane to give the crew instantaneous indication of its distance from two ground stations—thus "fixing" the position of the plane itself. An idea of the system's accuracy is gleaned from an actual test report which states that in a series of test flights *the "probable error" in the distances measured was not more than 50 feet!*

Essentially the operation of Shoran requires three major pieces of equipment—two ground stations and one airborne station. Altogether the ground and airborne equipment weighs about 1,000 pounds. A single operator can handle the set in the plane and one man is needed to run each ground station. A pair of ground stations may furnish Shoran to any number of properly-equipped planes but not more than 20 at one time.

The airborne installation can be adapted to almost any airplane that can stand the added weight. It consists basically of a timing unit, transmitter, two antennas, a radio receiver and special tubing. These component parts are located at any convenient place in the aircraft. The principal parts of a ground station include a radio receiver and transmitter connected together and, of course, a towering antenna. All ground units are transportable by air. *(Continued on page 86)*

Why THE JAP

Smashed by AAF bombs, this factory's output already had been reduced disastrously by conflicting Japanese factions.

AIR FORCE Failed

By JOHN LaCERDA

Jealous rivalry within her air forces speeded the collapse of Japan's war effort.

SCRAWLED in fire across the skies she once controlled, the story of Japan's defeat is largely a tale of treachery within her own air forces.

After her surrender, Japan had only 12,684 aircraft of all types in the home islands. Of that number only 4,000 were fully operable. One well-known reason for this scarcity of planes was that all pilots had been ordered to crash-dive invasion forces. Even fighters which flew cover were given only enough gas to get them to the targets. Aerial combat was to be specifically avoided. All aircraft were to be expended. American ships were the objective. But this suicidal refusal to give up, which for a time comprised the Jap's most serious threat to our invasion, is only a partial explanation of the depleted air fleets.

A far more significant reason is a disunited command that failed to inspire teamwork or to provide equipment for fighting men who were willing to destroy themselves rather than admit defeat. Records show that more than two-thirds of the planes remaining in the home islands at the war's end were grounded through muddling inability to supply fuel or minor replacement parts—4,000 of the grounded planes were front-line combat craft. And there are far more incredible illustrations of this same disunity of operation. Here are a few:

1. Ammunition for army planes would not fit the guns of navy aircraft.

2. Each service had its own radio wavelength, a foolish business which prevented communication between army and navy planes, causing general confusion.

3. Army radar equipment was not developed to identify navy planes from those of the enemy.

4. Factories making planes for both services used separate construction equip-

(*Continued on page* 90)

Jap KI-108 was one of several excellent experimental jobs which failed to get into production. Only four of the twin-engined high-speed fighter-bombers were completed. Plane easily outdistanced Hellcat during AAF test

REPORT FROM WASHINGTON

By FRED HAMLIN

WE'RE ONLY a bird in a badminton game when it comes to GCA, SCS-51 (poddon, we mean the CAA instrument landing system), or any of the other all-weather flying aids appearing on the horizon. Trouble is, one man's landing system is another man's pain in the neck, and every time we see a demonstration and tell somebody that system X seemed okay, he turns out to be a partisan of system Y or Z and we fly home minus another handful of tail-feathers. . . . Latest we can report is that we saw with our own eyes a pilot with less than 100 hours land a *Lodestar* (he'd never touched *Lodestar* controls before) under GCA auspices at Indianapolis. He did it not only once, but several times. Perhaps more significant is the fact that the GCA in question was operating under the supervision of CAA, one of Ground Controlled Approach's less enthusiastic backers. . . . At the same time, we saw demonstrations of the CAA instrument landing system. It, too, worked effectively. We can also report that a GCA unit which can be operated by one man is being developed at the CAA Indianapolis station and that the CAA instrument landing system program is going ahead full throttle.

Winter Prospects

CAA's goal is to have some 89 new VFH instrument landing units operating by the time the snow flies and instrument weather closes in on airline operations. An additional 31 others will be installed by CAA during the first six months of 1947. Equipment, some of which is being turned over to CAA from the Army, is valued at $30,000 a unit, plus some $18,500 to install—a total estimated cost for the entire current program of $5,700,000. CAA has some $4,000,000 already earmarked for the work, plus an estimated $1,000,000 in Army surplus. . . . One Army group is as enthusiastic about the CAA system—S(ignal) C(orps) S(ystem) 51 in War Department parlance—as other Army groups are about GCA, which also has a strong Navy following. . . . Two civilian camps continue to thump the tub for their favorite, GCA, the most enthusiastic friends being lightplane pilots, who see in it a solution to their problems when they get caught in instrument weather. The other group is a large bloc of transport pilots who found GCA a godsend during the war and swear by it. CAA is still naturally partisan toward its own system and points to the support of airpline pilots (divided) and of the Air Transport Association (favorable on the record, luke-warm off).

Chief unvoiced ATA objection to the CAA system (SCS-51) is that it is some seven years old and that its life-expectancy in the bright new post-war world is, at best, only two or three more years. Besides, if it is installed near other electrical appliances—inevitable at most large airports—it is as full of "creeps" as an active baby, constantly throwing the pilot off. Why, then, spend large amounts of taxpayer money, plus cost to the airlines for cockpit equipment, for so short-term an investment? The answer to this question is at the bottom of the whole problem: CAA's system, for all its faults, is the best currently available. Thus, although as this goes to press not one CAA landing system installation has been approved for use by CAA's own inspectors and not one airline has asked to use it, nonetheless it will be in general operation before the end of the year. . . . As for the future, it is not without hope in the instrument landing field—for the airlines. T. P. Wright, CAA administrator, announced recently that the administration's post-war goal is an automatic landing system so accurate that the pilot can turn it on and fold his arms till the wheels touch. How soon it will come he refuses to predict but he is sanguine about the ability of U.S. engineering genius to lick the problem.

Director Martin, whose airport control plan split aviation in South Carolina.

Lightplane Dilemma

Where the lightplane pilot fits into this picture is obvious—he doesn't. CAA's stand continues to be what it has been for some time—when there is instrument weather, putt-putts should stay out of the air. The major problem, says CAA, is instrument landing for the big fellows, and for that alone has Congressional money been appropriated. . . . CAA persists in this stand despite the following facts. Recent tests at CAA's Indianapolis laboratories by pilots picked at random from different organizations, civilian and military, and representing all experience levels, show that on reaching the runway the odds are 10-to-1 in favor of GCA bringing the plane in, 10-to-1 against the CAA system. Pilots were almost unanimous in favoring GCA over the CAA system. A CAA pilot, using the CAA system, figuratively flew his plane into the ground more than a mile from the runway on one pass, was "hopelessly lost" on another. . . . CAA men who recommended putting GCA in Chicago—where trouble is said to be experienced with CAA's instrument landing installation—were promptly vetoed. . . . All of which borders on the scandalous but is, as here stated, purely factual. You can draw your own conclusions where private pilots are going to come out unless, as is being urged by the Aircraft Owners and Pilots Association under J. B. Hartranft, Jr., they take the whole matter up with Congress and press for an appropriation to install GCA.

South Carolina's Airport Ruckus

First round in South Carolina's state vs. free-enterprise fight for control of airports ended recently with a legislative decision in favor of state control.

Dexter C. Martin, director of the South Carolina Aeronautics Commission, won support for an airport system to be operated by his commission. Maintenance, administrative and engineering services are promised established airports that cooperate in the plan. Independent operators or municipalities refusing to participate in the plan are to receive no state assistance.

Opponents of the plan charged that if the system became law, Director Martin could exercise a virtual dictatorship over all South Carolina aviation. They pointed out that already his commission controlled a large aviation fund built up through a state tax on aviation gasoline. Gas tax receipts that averaged $56,550 a year during wartime are expected to show a steady increase.

Despite such charges, the General Assembly granted the $153,324 requested by Director Martin to initiate his state-controlled airport system. Martin now plans new revenue sources. From private operators and other concessionaires at the state ports he would collect rents on buildings and sites plus a two per cent tax on gross receipts. In addition to office rent, he would charge airlines landing fees of $1 per 1,000 pounds.

Larger municipalities rebelled. Already

(*Continued on page 94*)

Airmen's Sign Language

Stop signal is given to Cub pilot. Restricted visibility of many lightplanes, no less than airliners, demands services of taxi signalmen.

Do you want to know how to guide a taxiing airplane? Then study the photographs and captions on pages 48 and 49.

ASSUMING GUIDANCE

Arms extend upward, hands open, fingers together. Palms face each other.

COME AHEAD

Palms toward face. Speed of beckoning motions indicates plane speed desired.

RIGHT TURN

Right hand indicates "come ahead." Left hand points to right wheel to be braked.

CUT ENGINES

Right index finger drawn across neck. Left hand designates engine desired.

INSERT CHOCKS

Arms downward and out, back of fists toward plane. Thumbs sweep together.

START ENGINES

Emergency stop signal first; then one hand points to engine, other rotates.

R.P.M. INSTRUCTIONS

Right forefinger is rotated. Left thumb up is "increase" and down "decrease."

MIXTURE INSTRUCTIONS

Three right hand fingers are extended. Left thumb points up (richer) or down.

ATTENTION

Right arm and index finger are extended, finger points to object of attention.

THE mysterious motions used to guide taxiing airplanes are based on those used in radio, where program directors in soundproofed control rooms must use hand signals instead of spoken words. Those illustrated here have been accepted as standard by commercial airlines and some airport operators and many of them are being used by the air forces of the United States, Great Britain and Canada.

The taxi signalman who gives these directions remains at all times in such a position that he can see the eyes of the pilot. Ordinarily his position is specified as on a line extending directly forward from the left wing tip. When a signalman is moving an airplane in close quarters, wing men are stationed beneath each wing tip. They keep in plain view of the signalman who relays their signals. A number of run-up signals are omitted here; those illustrated are believed to be of most interest to private pilots.

ead "left
e braked

hen one
rotates

extend
ttention

LEFT TURN

Left hand executes "come ahead," right hand points to left wheel to be braked.

PULL CHOCKS

Arms downward and out, back of fists toward body. Thumbs sweep outwards.

FLAP MOVEMENT

Right arm is given rolling motion. Hand position indicates flaps are up or down.

ADVANCE THROTTLE

Right forefinger points up. Left forefinger pushes it down away from body.

STOP

Hands raised to eye level, elbows stay flexed. Palms turn outward toward plane.

SLOW DOWN

Hands at waist level. Elbows are flexed, palms make downward patting motions.

TAIL WHEEL REVERSED

Left index finger extends down to touch raised left heel, right arm against body.

NO GOOD

Arms raised to shoulder level and palms out, alternately crossed and uncrossed.

EMERGENCY STOP

Hands raised to eye level and clenched into fists. Elbows stay flexed at sides.

ALL CLEAR

Thumbs up gesture indicates all clear. Not clear is indicated by a stop signal.

CLOSE THROTTLE

Right forefinger points up. Left forefinger pulls it down toward the body.

CALL OPERATIONS OFFICE

Right forefinger at temple while rest of hand is closed, left arm relaxed at side.

The big four-engined Boeing Clippers that helped pioneer ocean flying for Pan American Airways are on sale as war surplus.

Three of seven Boeing Clippers left in the United States are on display at Floyd Bennett Field. Costing $750,000 new, the surplus planes will be sold by U. S. Government for $50,000 each. President Roosevelt flew to Casablanca in Dixie Clipper, right.

THE big Boeing *Clippers* that turned the oceans into American lakes are up for sale by the War Assets Administration, price: $50,000 each. The seven left in the United States all could be bought for less than half the original $750,000 cost per plane.

The 12,000-hour veterans served mightily in the war. They carried millions of pounds of mail over millions of miles of airways, crossed the oceans thousands of times with hundreds of thousands of passengers. Three of them made 12 Atlantic crossings in one memorable period of 13 days and 15 hours in December, 1942, when they flew key personnel to and from newly-invaded North Africa. At other times they carried President Roosevelt to Casablanca, Queen Wilhelmina, Crown Prince Olaf of Norway, and other notables.

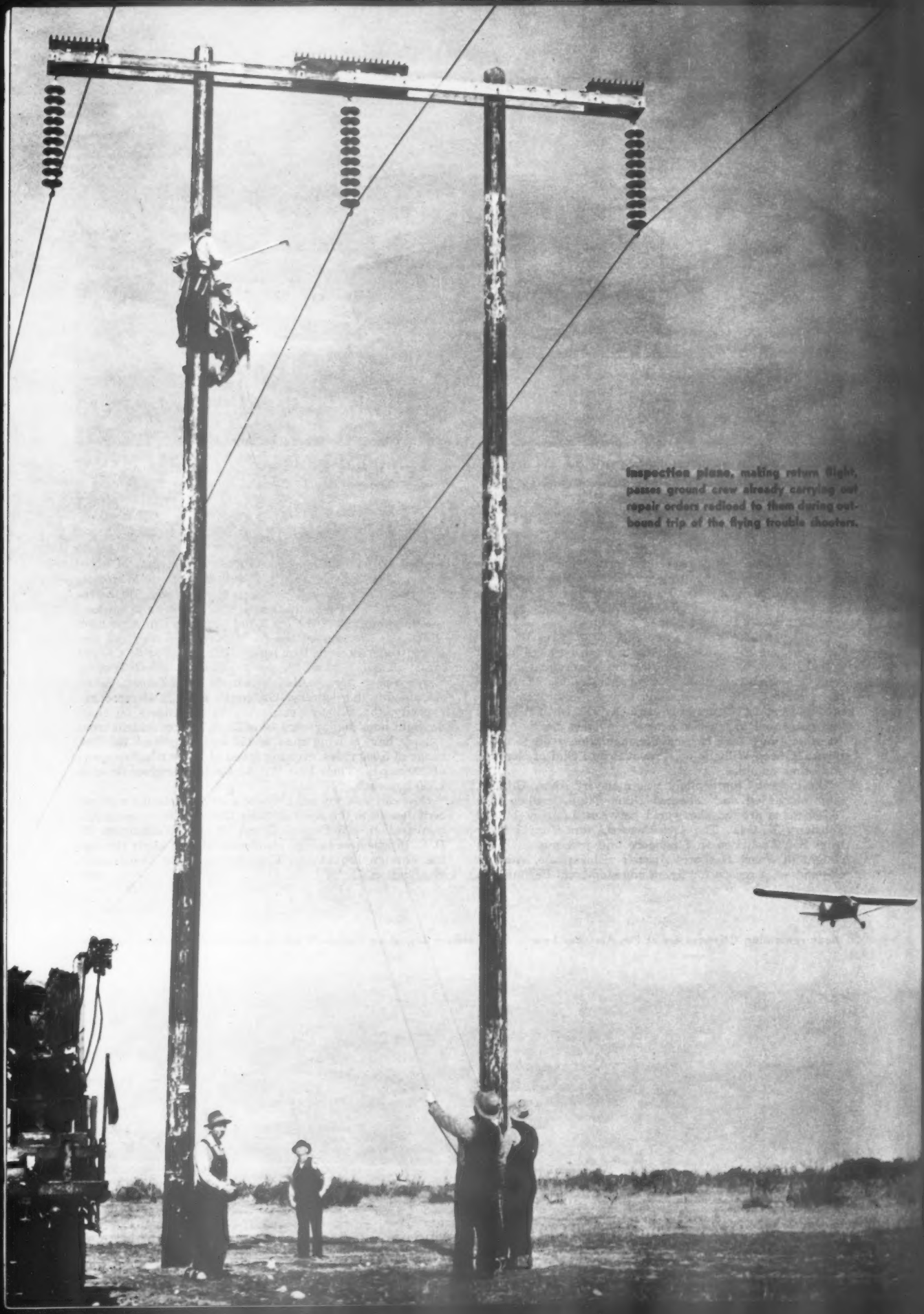
The longest *Clipper* flight was made by *Anzac Clipper*, later converted and renamed *Dixie Clipper* which flew 26,700 miles around the world between January 14 and February 27, 1943. The *Anzac* was the first *Clipper* to fly from San Francisco to Singapore and just missed being caught at Pearl Harbor. *Anzac's* sister plane, *Atlantic Clipper*, set a record for flying non-stop from Bermuda to Lisbon in 1940, and once carried 52 passengers and 18,000 pounds of air freight from Natal, Brazil, to Monrovia, Liberia. *Capetown Clipper* blazed an air route to Africa and inaugurated scheduled mail service over the route.

Boeing built 12 of the big flying boats for Pan American. When the war started the Navy purchased them all and leased them back to Pan Am. Of the 12, *Pacific Clipper* was lost and *Yankee Clipper* crashed in Lisbon Harbor. Three others went to the British via Lend-Lease. Seven remained in this country. Ordinarily rated at 41-passenger capacity, the *Clippers* can carry 74 passengers on short daylight hops and average 20 to 35 on long overnight trips.

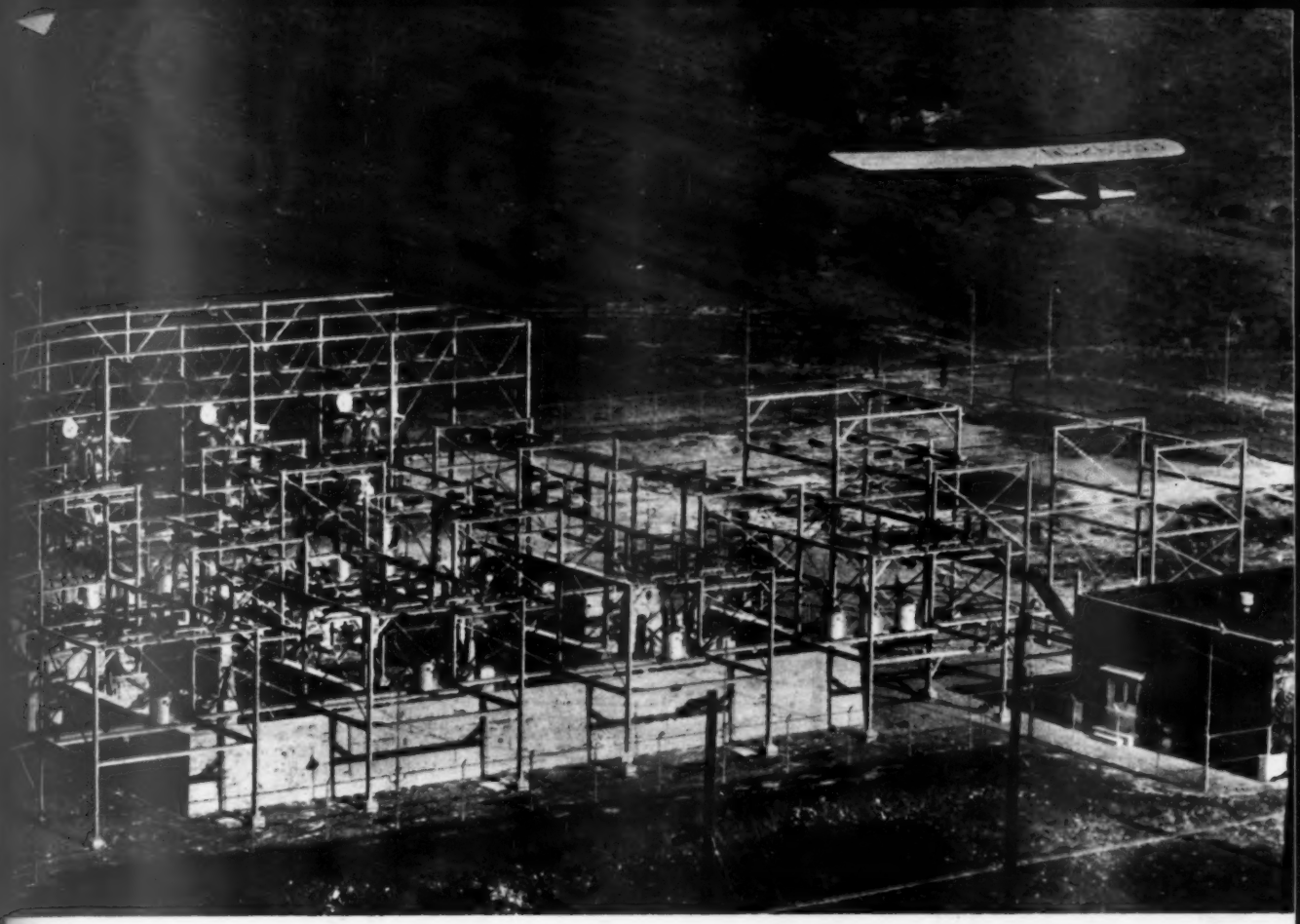
They have a wing span of 152 feet, length of 106 feet, range of 5,000 miles, cruising speed of 150 m.p.h., top speed of 200 m.p.h. Their four Wright *Cyclone* engines develop 1,550 h.p. each.

How can you buy one? Write a letter enclosing a 10 per cent deposit to the Aircraft Sales Division, War Assets Administration, 425 Second Street, N. W., Washington 25, D. C. Prospective foreign purchasers should apply through the Foreign Liquidation Commission, State Department, Washington, D. C. END

Four remaining Clippers are at Pan American base in San Francisco Bay, where they await sale by the War Assets Administration.



Inspection plane, making return flight, passes ground crew already carrying out repair orders radioed to them during outbound trip of the flying trouble shooters.



Terminus of the 65-mile inspection flight from San Diego is this San Juan Capistrano sub-station, a major power dispersion point for southern California. Plane takes two hours for round-trip inspection that once, during wartime ban on flying, took eight days.

Power-Line Patrol

A lightplane and two-way radio speed trouble-shooting along one of the west coast's vital power arteries.

Inspectors Stone and Peik plot their high-voltage run.

TIGHT-ROPE artists have nothing on Arnold Peik and Walt Stone of the San Diego Gas and Electric Company. They are high-line experts, too; only they don't walk the lines—they fly 'em.

Every two weeks, for the past two years, Peik and Stone have flown their Taylorcraft patrol plane the 130-mile round trip from the company's main station at San Diego to the mission sub-station at San Juan Capistrano. Their job is to spot power-line trouble as they skim at 70 m.p.h. alongside the arterial wires that carry electric power to a major section of southern California.

The high-voltage flight demands constant vigilance. With 450 two-pole structures to check, one every 750 feet, flight altitudes seldom exceed 300 feet (the plane, marked "Electric Inspection," has a special CAA permit to fly at low altitudes). Much of the

Flying parallel to high-voltage lines, inspectors watch for sagging wires, poles out of alignment. Reports keyed to schematic maps are radioed to ground crews.

Trouble car of strategically located ground crew picks up radioed orders (above) and return leg of flight finds ground crew already on job (below).

time the plane is a scant 30 feet above the "hot" wires—closer to them than a ground inspector could get.

Terrain is rough and a forced landing often could mean a crash. Sudden side gusts or down drafts might even mean electrocution for the two flyers. But Pilot Peik maintains that the job seems far less dangerous to him than that of the linemen who climb the 60-foot poles to make the repairs that Observer Stone orders.

Those linemen comprise the other half of the San Diego company's modern trouble-shooting team. There are 10 ground crews, each with a radio-equipped supply truck. Trouble reports radioed from the inspection plane are picked up by the company's own radio station, KROA. Keying the reports to a schematic map, orders are then relayed to the most strategically located ground crew. Usually the crew is on the job by the time the plane makes the return leg of its flight check.

The two-way flight inspection of the lines can be made in a little over two hours. During the war-time ban on west coast flying, line inspection—made, of necessity, on horseback—required eight days to complete. Because of the vital power load carried by the lines complete inspection must be made every two weeks. Only once has the plane failed to meet the schedule—when the entire area was fogged in.

In addition to the routine dangers of the flight, occasionally there are those unexpected hazards which the flyers claim only add "a bit of adventure to a routine job." Part of the flight route lies over Camp Pendleton. Special permission to fly over the area is obtained before each trip. But once the flyers ran right into some artillery practice. Exploding shells almost blew them out of the air.

And once a sheep herder took a pot shot at them. Thinking the flyers were trying to frighten his sheep, he let loose with a double-barreled shotgun blast. Airport employees counted 27 buckshot holes in the airplane's fuselage that evening. END

LONDON LETTER

By Maj.
OLIVER STEWART
British Authority. Editor of Aeronautics

AIR pageants used to be one of the popular amusements in Britain. People would go for miles, complete with the family and with a sandwich lunch, to watch aerobatics, racing, comic turns, mock combats, experimental planes and all the other items that belong to an air pageant.

The Royal Air Force display drew the biggest crowds but big crowds were the rule at all these shows. Now they are starting again. The first is under the auspices of the Air League of the British Empire and is to be held in the latter part of June at Southampton Airport. Chairman of the Southampton branch of the Air League is H. P. Folland, designer of the 1914-18 SE-5 and a long line of successful fighters extending to the recent war's *Gladiator*—the RAF's last biplane fighter.

Air racing is to start in September with a Folkestone event for low-powered aircraft. It will be run by the Royal Aero Club. These events in the past have ranged between the extremely dangerous—when the spectators were thrilled because accidents were frequent and nasty—or the extremely careful—when the spectators were bored because nobody got hurt.

Few remember that one of the most effective turns ever seen in England at any display was the 1930 crazy flying by Air Comm. Frank Whittle (inventor of the gas turbine) and his partner. Whittle is a fine pilot and on this occasion he flew an Avro 504N and managed to put on an amazing show, with flat turns, side-slips and all the rest at grass-top height. He and his partner did one "collision" which, to the amazed spectators, looked like the real thing.

Reduce Flying Costs

Flying charges at the London Aeroplane Club, which is now working at Panshanger Airfield, north of London, have been reduced from $22 an hour, dual or solo, to $14 an hour. The aircraft are de Havilland *Tiger Moths* and *Hornet Moths*.

Nobody knows how this reduction has been achieved. But even at $14 an hour there will not be many in tax-ridden Britain rich enough to do much flying. Taxation is such that in the low income groups a man must earn $28 to get one hour's flying. In the higher income groups he may have to earn $60. That's the reason aircraft constructors in Britain hesitate to build for the personal aircraft market—it's too big a gamble.

Flight-Trained Ministry

British aviation ministers usually know little about aviation when they come to the job. But usually they try to learn.

Ivor Thomas, Parliamentary Secretary to the Ministry of Civil Aviation, has been learning to fly under a RAF instructor. By the time these notes appear he should have taken his "A" license.

One of the best efforts in this direction was that of the Marquess of Londonderry. Although born in 1878, Lord Londonderry learned to fly after he had been appointed Secretary of State for Air in a pre-war British Government. He became a good, steady pilot.

Some critics say that the little knowledge they thus gain is a dangerous thing. But more widely held is the view that it is of value to them. Capt. Harold Balfour, now Lord Balfour of Inchrye, was the only minister who came to the job with extensive piloting experience.

Gliding Wing

When Americans talk of "flying wings" they are apt to think in terms of Northrop's XB-35, a bomb-carrying giant that is powered by four 3,000-h.p. engines. British experimentation, however, aims at producing a new type of fighter craft.

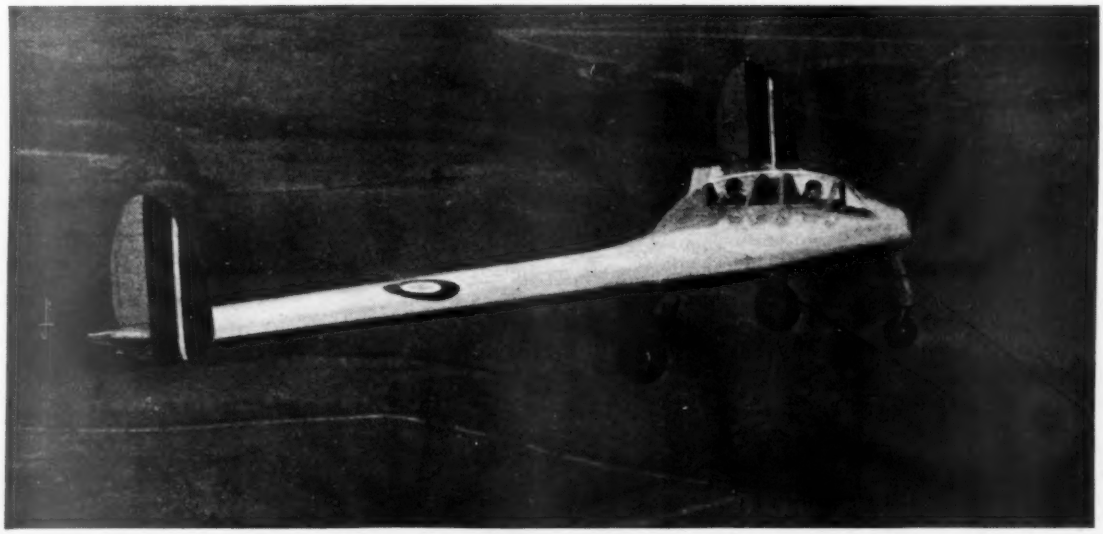
The Armstrong Whitworth tailless aircraft seems a small thing beside the Northrop but it is a preliminary experiment aimed at the eventual design of a jet-driven tailless machine. The Armstrong Whitworth tailless glider is towed to 12,000 feet and then cast off. Control and other tests are made during the time the plane glides to the ground.

Helicopter Hopefuls

Although no successful British-designed helicopter is yet flying, the two organizations which concern themselves with encouraging the development of helicopters are active. They are the Helicopter Association and the Helicopter Society.

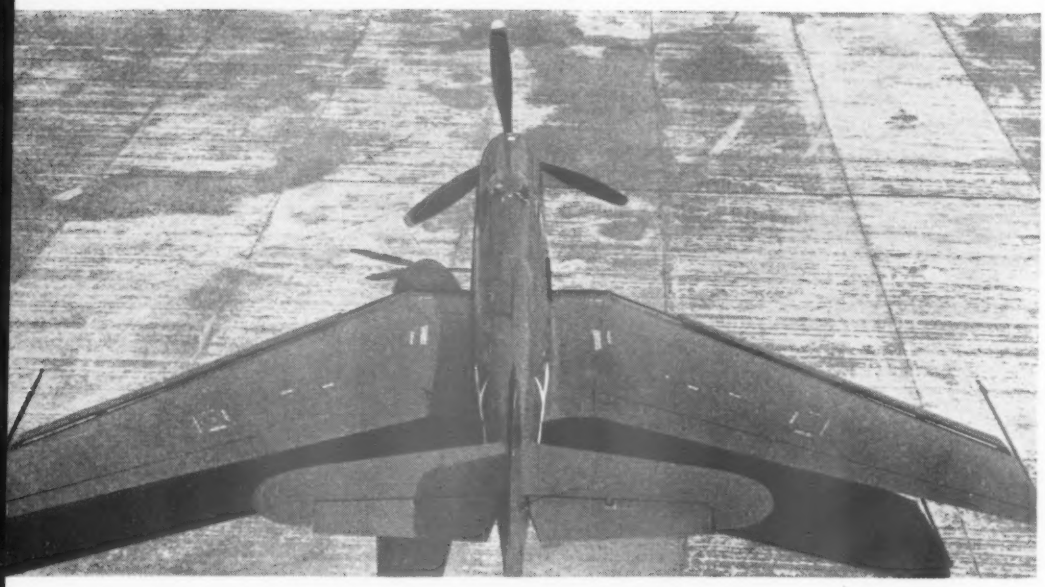
The Association was the first to be formed but it is not well known to the general public. The Society, with Group

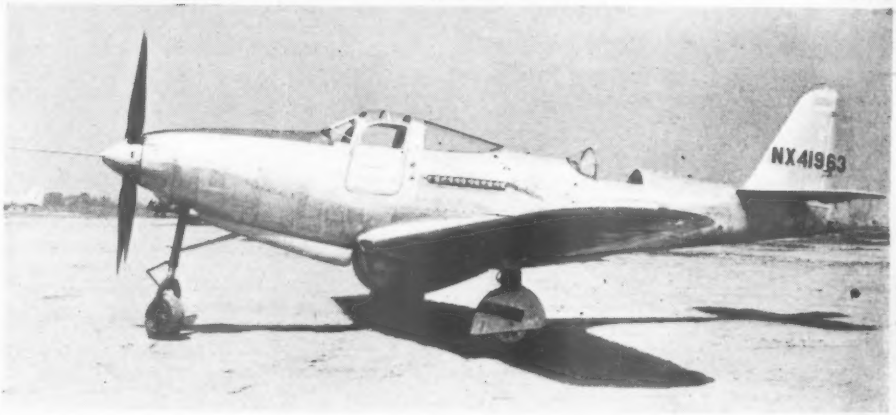
(*Continued on page* 106)



Tailless glider built by Armstrong Whitworth is preliminary experiment toward development of jet-driven flying wings.

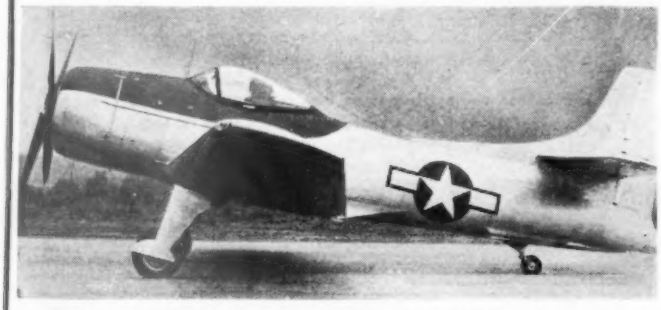
HAVE YOU SEEN?



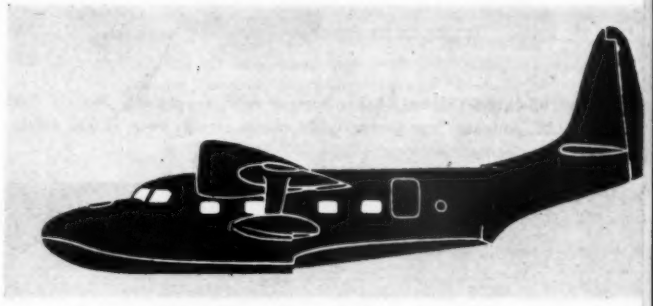


Three Bell experiments on P-63s include swept-back wing (above) to test supersonic flight characteristics for Navy. Plane at right is one of 25 having second cockpit to carry second pilot on instrument-flying tests. Plane below has a "butterfly" tail, has proved to be a cheaper design to produce, weighs less and has less downwash. Only swept-back wing experiment is undergoing further tests.

Movie Star Wayne Morris, veteran Navy fighter pilot during the war, still keeps his hand in as a member of the Naval Reserve.



Fleetwings XBTK-1 was experimental Navy bomber-torpedo plane. Span was 48 ft. 8 in., gross weight 14,000 pounds, speed 360 m.p.h.



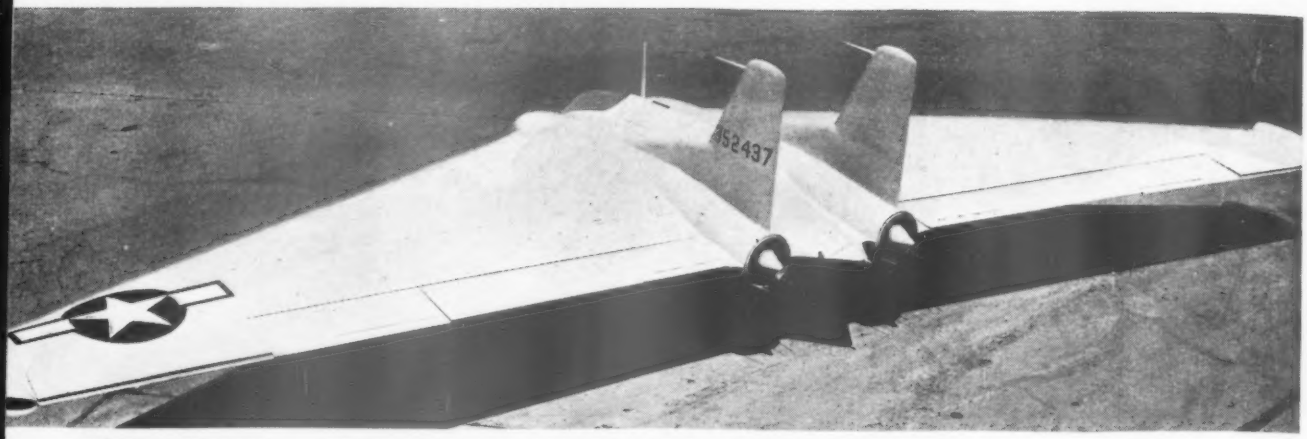
Grumman Mallard amphibian has two 600-h.p. engines, carries six passengers 830 miles at 180 m.p.h. Weight, 12,000 lbs.; span 66 ft. 8 in.

Central Centaur, built experimentally in Wichita, has shaft-driven propeller, 90 h.p. Estimated cruising speed is 140 span 28 ft. 4 in

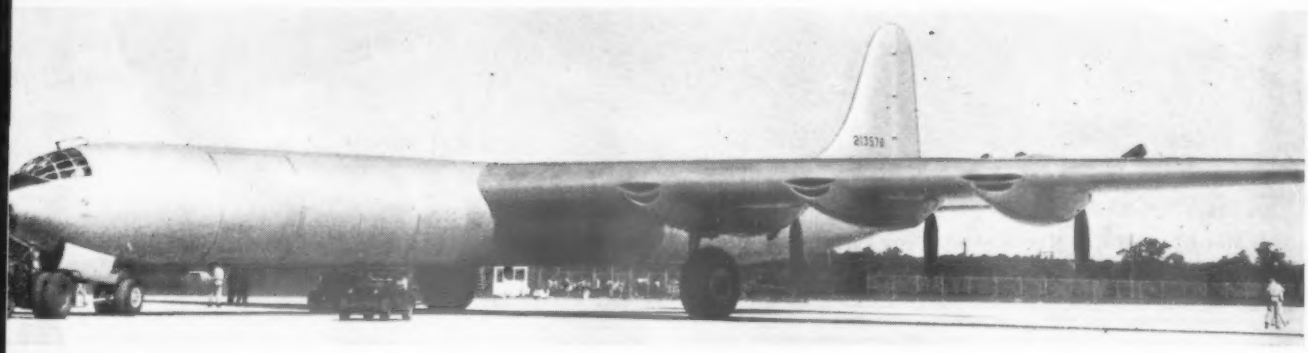
Douglas XB-43 is first AAF jet bomber. Similar to engine-driven XB-42, it has twin jets with exhausts in the tail under the elevator

HAVE YOU SEEN?

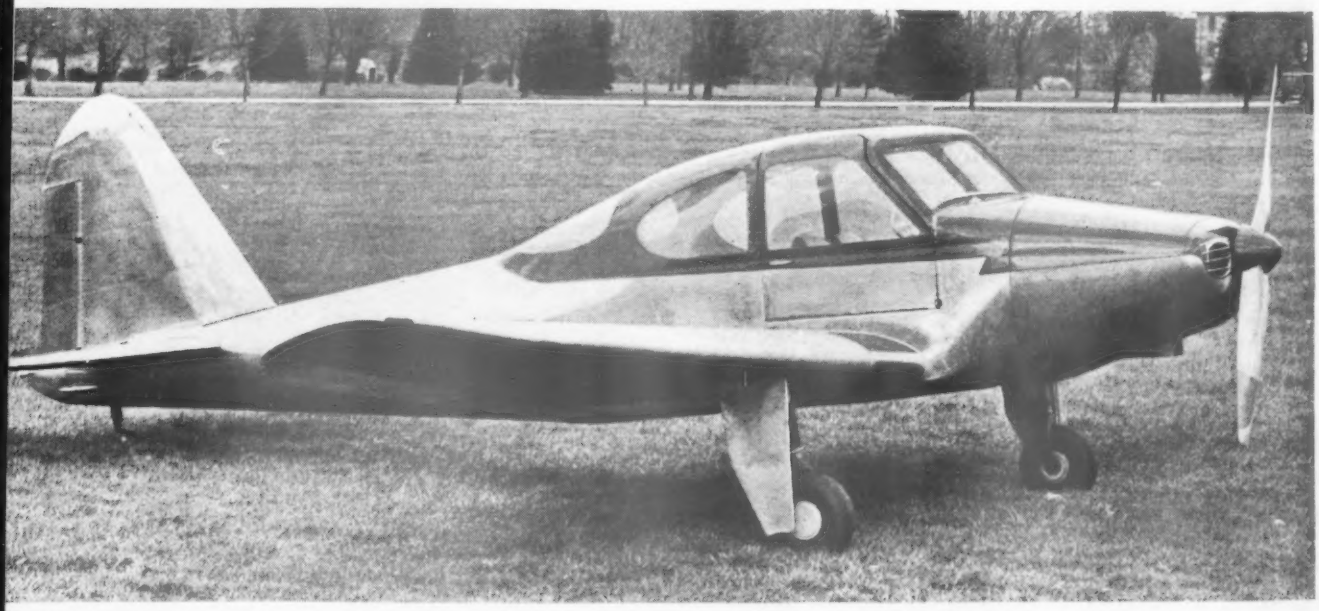
(Continued)



Northrop Flying Ram is radical jet fighter being tested. It is tailless, has twin jets, carries its pilot in prone position. XP-79 has combat speed over 500 m.p.h., span of 38 feet. Operating altitude is 25,000 feet. Entire plane is magnesium and welded.



Consolidated-Vultee XB-36, newest AAF supergiant, has six 3,650-h.p. air-cooled pusher engines. Span is 230 feet, gross weight, 250,000 pounds. Top speed is 394 m.p.h., range over 10,000 miles. It will carry a crew of 17 and an estimated bomb load of 36 tons.



Piper Skysedan is planned for 1947 production. It is four-place, has 165-h.p. engine, will cruise 620 miles at 140 m.p.h. Skysedan is all-metal, has retractable gear, stalls at 40 m.p.h. Span is 34 ft. 8 in., gross weight, 2,400 pounds; length, 26 feet.

I Learned About Flying From That! No. 81

Haste could have caused a serious crash when this pilot tried to take off without a cockpit check and with a frosted windshield.

By CLEMENT G. SCERBACK

A WELL-COWED cadet stood in the ready room that cold January morning listening to the snapped-out instructions of The Holy Terror. Today I would fly formation, yes sir. Today I would fly Vultee *Valiant* No. 350, yes sir. I would swiftly hunt up my parachute and more swiftly get out on the line and warm-up No. 350.

The Holy Terror, my instructor, had a reputation about the field's cadet quarters for being short on his temper. I, the cadet, was in a mighty hurry to get out on the flight line and add a few more hours to that 40-odd I had logged on the *Valiant*.

But, on reaching the ramp, 350 was nowhere to be seen. It's usual parking place was empty. With parachute bumping the back of my legs, I dashed up and down the apron seeking my airplane. Surely by now my instructor was fuming in his cockpit and devising ways of making my life more miserable because I was delaying his schedule.

Then I spotted 350. It was setting off the ramp on the washing platform. The ground crew had given her a rubdown the night before.

I scrambled into the cockpit, feverishly checked Form 1-A and found the plane to be airworthy and ready to fly. Switching on the ignition, I noticed that the entire canopy, especially the front windshield, was covered with a thin layer of frosty ice that made visibility impossible.

The radio crackled into life and then came the impatient voice of Lieut. Holy Terror.

"Three-five-zero! Mister, you'd better get on the ball! We're waiting."

It whipped me into a flurry of action. However, I still worried about that ice while priming, energizing, and engaging the engine.

As I let the plane idle a few minutes, checking fuel and oil pressures, I decided to take a chance on the propwash clearing off the ice by the time I reached take-off position.

That was my first mistake.

Calling the lieutenant, who was in No. 347, I reported that I was taxiing out to meet him. I released the parking brake and started to S-turn out to take-off position.

Meanwhile, the canopy ice refused to clear in the propwash. I pulled out on the taxi strip directly behind the lieutenant, and another cadet swung in behind me to make up the three-plane element.

The lieutenant immediately lined up his plane on the runway. As I momentarily hesitated, still worried by the ice situation and anxiously searching my mind for something else I felt was wrong, he waved me out alongside him for a formation take-off.

The normal practice in a *Valiant* is to keep the front canopy open during take-off, but in this case it was a necessity since it was the only way I could see where I was going.

The lieutenant started down the runway; I followed with full throttle and we were off.

It was then that things began to happen.

For one thing, my overseas cap flew off my head. This in itself was unimportant but it was a prelude to the general confusion that was to flood my cockpit in a moment. Immediately after the cap sailed away, possibly at the same moment, the earphones tore loose into the slipstream, their Y-cord catching on the bridge of my nose.

Then, as the plane gathered speed, the full force of the slipstream struck my unguarded eyes, momentarily blinding me.

Suddenly I became aware of another difficulty. The plane's wheels were still in contact with the runway but they began a sharp swing to the right. I instinctively stepped on the rudder, finally resorting to standing on it, but to no avail.

Unable to straighten the plane out and with a hard snowbank off the runway directly beneath my nose, I "horsed" back on the stick to pull the trainer into the air and clear the obstacle. To my utter dismay, the plane showed no inclination to fly; the stick refused to budge!

Fortunately, the snowbank was solid and slanted on my side. The wheels struck it a glancing blow at 80 m.p.h. and whether it liked it or not, the plane was virtually catapulted about 15 feet into the air. But it had no intentions of remaining there and despite my wrenching at the stick it dove back into the ground with a teeth-rattling jar. Back into the air again, and by now I had exhausted the length of runway. The next "landing" was a smashing one into the hard, rough earth beyond the pavement. Showing, finally, a presence of mind that had been sadly lacking so far, I cut the power. The plane stalled in with a shock that I was certain had driven the wheel struts through the wings.

Though I did stay on terra firma this time, the plane cavorted across the ground with the speed of a locomotive, performed a few sharp S-turns, almost tore a furrow into the ground with the right wing-tip and finally, with the aid of brakes, did a nasty ground loop and halted about 10 feet from the barbed wire fence which ran along the boundary of the field.

I doubt if the control tower realized what a wild ride it had been. Bearing this in mind, I ascertained that the plane would still taxi, and then called the con-

(*Continued on page 116*)

THE LIBRARY

THE BUSINESS LAW OF AVIATION, by Gerald O. Dykstra and William G. Dykstra, published by McGraw-Hill Book Company, Inc., New York, in 1946. 523 pages. Price $5.00.

According to the book jacket, "The purpose of this combined text and case book . . . is to present a convenient compilation of the leading court decisions . . . and to call attention to the Federal and state statutes which govern this field of business." An introduction deals with the scope of the book and some definitions; Part II, Jurisdiction and Regulation, covers Federal, state and municipal control; Part III, Major Torts, discusses trespass, nuisance and negligence; Part IV, Common Carriers; Part V, Insurance and Workmen's Compensation; Part VI, Contractural Relationships, including contracts and bailments; Part VII, Penalties and Crimes; and Part VIII, International Aspects, dealing with the Warsaw, Rome and Brussels conventions.

The reader must conclude that this book was intended primarily for law school students inasmuch as over half of the pages are devoted to excerpts from court decisions, and since nearly a hundred legal problems are scattered throughout the book—at the chapter ends. If so intended, it is regrettable that the authors have omitted all reference to the great wealth of article and documentary material to be found in the various law reviews and other current publications.

The aviation legal fraternity will find the book of such an elementary nature that it is of little value; the layman will drop it quickly when he once passes the few pages of text and encounters the case material. Let us hope that the law student will find it sufficiently stimulating so that he will carry his search further into those aviation legal problems which are rapidly becoming more and more complex. —FRED D. FAGG, JR.

THE AVIATION ANNUAL OF 1946, by Reginald M. Cleveland and Frederick P. Graham; published by Doubleday & Co., Garden City, N. Y., in 1946. 309 pages. Price $4.

Add this perennial to the other aviation annuals currently hitting the market. It is one of the best, being weak mainly in its discussion of aircraft types, and in its index — although the latter is the best index in any of the aviation annuals we've seen to date.

Cleveland and Graham are on the staff of the New York *Times;* Graham is aviation editor of that paper. Both have an above-average knowledge of aviation and consequently have done a good job of boiling down and rewriting the mountains of material that had to be considered in the preparation of this aircraft reference book.

The book contains 64 pages of photographs but they are just inserted in miscellaneous 16-page groups, with little relation to the text. In a book of this kind, which will be used for reference and historical purposes in years to come, photographs, drawings and diagrams should be used to their greatest advantage. They appear to have been tossed into this book more to be talked about as a selling point than to serve the reader. Also, many of the photographs used are of obsolete or obsolescent aircraft, a rather surprising bit of carelessness in view of the authors' standing in aviation writing circles. —MAX KARANT

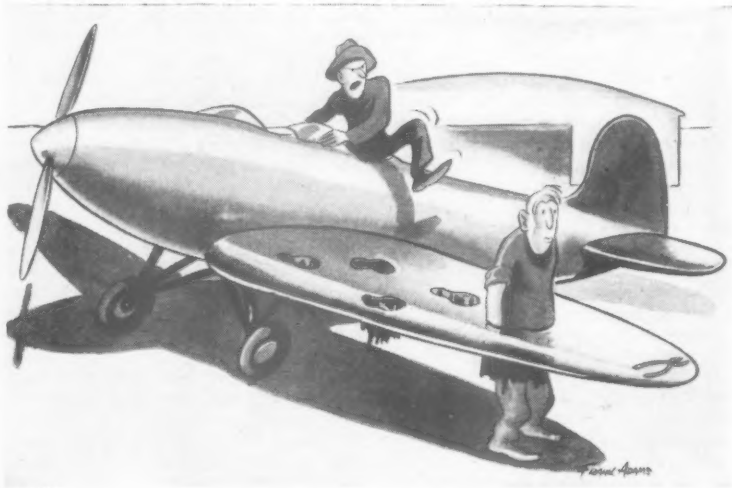
THE HOW OF THE HELICOPTER, by Alfred H. Stevens, Jr.; published by the Cornell Maritime Press, 241 W. 23rd Street, New York, N. Y., in 1946, 57 pages. Price, $2.

Here's one of the first books on the helicopter written specifically for the teenager. Its chief importance lies in the fact that the helicopter and the boys and girls of today are growing up together. It offers to these potential rotary-wing pilots and passengers (and to their fathers and mothers as well) the basic "how" of practical American helicopters in their present stages of experimentation and development.

In keeping with his title selection, Author Stevens tells how helicopters were invented, how they fly, how they are flown, how they are used today and may be used tomorrow. Once a cross-country flying ace, Stevens, spent two years in a war plant building gliders. More recently he has been writing technical releases on helicopters at the Sikorsky plant in Bridgeport, Conn. His book, therefore, is authoritative—in addition, it is easy to read and not at all difficult to understand.

The numerous two-color illustrations are the work of Aircraft Artist Ernest Stock, a World War I pilot who during World War II was production illustrator at the Sikorsky plant.

Together, Stevens and Stock manage to get across a considerable amount of information about the history and aerodynamics of helicopters without use of equations, formulas, charts. The book's bright, lucid style and clear drawings make it a very good addition to the family library. —PAUL FOUNTAIN



FLYING

"Oh—let it go. I'll get 'em myself."

SHORT VIEWS

REALM OF FLIGHT and PATH OF FLIGHT, by George Sidney Stanton, published by U. S. Department of Commerce, Civil Aeronautics Administration, U. S. Government Printing Office, Washington 25, D. C. Prices, 60 cents and 40 cents.

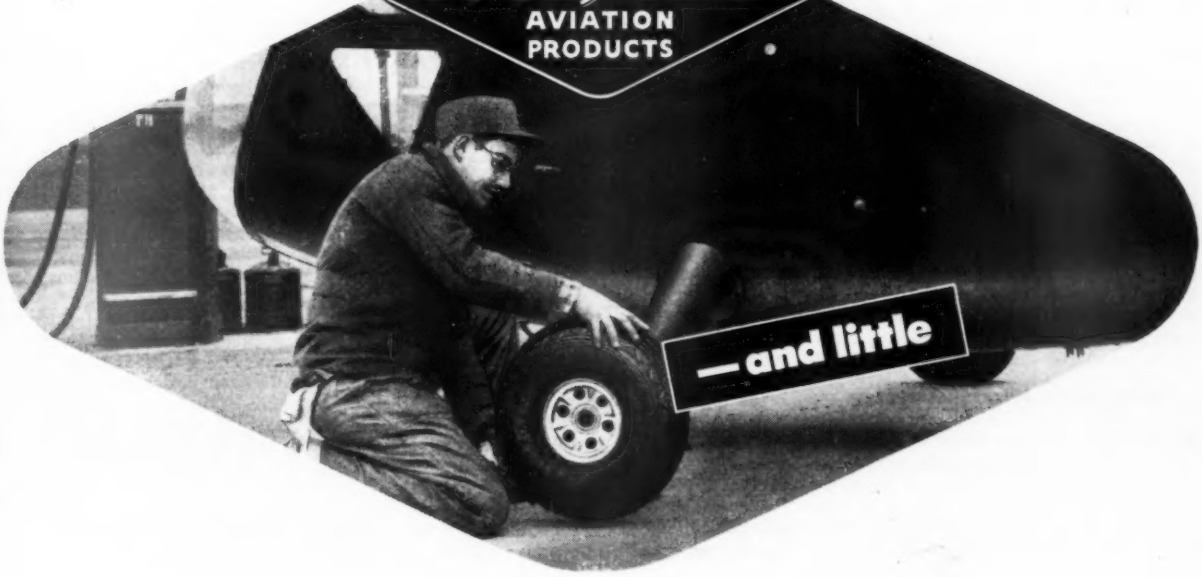
Realm of Flight is the first in a series of aviation manuals prepared by the Civil Aeronautics Administration. Purpose of the series is to give the private pilot essential information for operating his aircraft safely. This one provides a general background of weather knowledge. It compiles aids provided by the Weather Bureau and the CAA with respect to weather information, interpretation of weather maps and how to avoid dangerous conditions. The booklet is illustrated with four-color maps and diagrams.

Second in the series, *Path of Flight,* presents basic information about the navigation of private aircraft. The discussion is limited to the needs of private pilots who do not have instrument ratings. Many illustrations are provided, as well as a sample aeronautical chart. END

More aircraft land on Goodyear tires than on any other kind!

Goodyear, Aviation Products Division, Akron 16, Ohio
Los Angeles 54, California

GOODYEAR
AVIATION
PRODUCTS



AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

The Aircraft Owners and Pilots Association (AOPA), with National Headquarters Office located in the International Bldg., 1319 F Street, Washington 4, D. C., is a non-profit organization composed exclusively of pilots. It looks after the pilot's best interests in all phases of aviation and helps individual pilots with their individual problems. The AOPA operates with a full-time professional staff and is the largest group of civilian pilots in the world. This column is edited by the Aircraft Owners and Pilots Association and opinions contained in it are not necessarily those of FLYING. A special bulletin is sent each month to all registered AOPA pilots and also confidential newsletters from AOPA's Washington staff are sent members from time to time.

PRAISE NEW INSURANCE RATES

In the past few weeks 25,000 pilots, who have registered with the Aircraft Owners and Pilots Association since 1939, received an announcement through the mail from their association's general manager, J. B. Hartranft, Jr., telling about a new insurance program arranged by Lloyds of London which will save AOPA pilots thousands of dollars yearly.

The response to this announcement has been more enthusiastic than officials had anticipated; pilots and aircraft owners quickly responded to the announcement which enabled them to save from 25 to 40 per cent on their insurance costs with generally broader contract coverages than are available to non-AOPA members.

One AOPA member summed up the situation: "An active pilot can no longer afford NOT to be an AOPA registered pilot."

ADDITIONAL SAFETY STUDIES PLANNED

Additional studies on accident causes have been undertaken by AOPA in connection with its intensified safety program. Past accident records and findings are being reclassified and carefully sifted to determine the relative safety records of various aircraft. The National Advisory Committee for Aeronautics has again been advised of detailed studies which AOPA has asked to be undertaken by that group for the improvement of performance and safety of the personal aircraft. Also included are the problems of noise abatement—the muffling of aircraft engines and the perfection of improved propeller designs.

CRASH INJURY RESEARCH SUPPORTED

In addition to its own safety program, AOPA is actively supporting independent outside efforts. For example, the association has recently contributed funds to assure continuation of the Crash Injury Research Program. This fact-finding group has contributed greatly toward safety in aircraft structure and its studies will now be continued.

The group, allied with the Cornell Medical Department and the National Research Council, has made sweeping discoveries about the safety, or lack of safety, in the cockpit design of aircraft. They have learned many things about inadequate seat belts and fittings, and they have analyzed the effect of certain types of instrument panels and protruding control knobs which have caused needless injuries.

Improperly stressed seats have been found, along with poorly-designed structural members which collapse inwardly in a crash, thereby causing injury. Rudder pedals and control wheels are sometimes offenders and, when redesigned, avoid serious or fatal injuries.

All in all, AOPA pilots, through their aggressive association, now have many people working on practical safety projects which produce results rather than merely reports or speeches. Vast facilities are now at the command of AOPA pilots who can take pride in the knowledge that, through their association, they are vigorously bringing about these important improvements and reforms.

CAA RESEARCH TAKING FORM

AOPA has recently witnessed some of the projects being sponsored by CAA at their Indianapolis experimental station. We offer congratulations to officials for this fine work. In last month's AOPA *Pilot* (confidential monthly report sent to registered AOPA pilots) mention was made of the belated tests being run on Ground Controlled Approach (GCA) which AOPA strongly advocates in lieu of the so-called SCS-51 system which has recently been renamed "The CAA 'Blind Landing' System." GCA is favored by AOPA because it requires no additional equipment in the private flyer's airplane and very little skill on the part of the pilot, neither of which can be said for SCS-51.

In addition to the GCA tests, there are experiments in progress to find a fire-resistant "dope" for aircraft fabric; something which will retard fires sufficiently long to apply fire extinguisher fluids. There is also an interesting project on stall warning devices and another one which concerns the development of windshields to withstand the impact of flying birds.

AOPA has offered several suggestions on each of these projects and further comment from readers of this column is invited. Need for research in all of these things and on aircraft design is particularly acute. With some few noteworthy exceptions, pilots "are still being offered 1932 airplanes in 1946" (this expression is used so frequently we squirm every time it appears in our correspondence).

FABRIC BOWS SLOWLY AND EXITS

Some months ago this column stated that it was high time manufacturers discovered that it actually would be cheaper to build an all-metal airplane than a fabric-covered craft. This statement aroused a variety of noises ranging from shrill cat-calls to boisterous Bronx cheers.

Notwithstanding, we stuck to our guns and have now noted that one manufacturer after another is installing metal-working machinery anticipatory to scrapping the old welded tube and fabric method which consumed so many man-hours of work. There is the all-metal Republic *Seabee*, the all-metal Globe *Swift*. Ditto the North American *Navion* and four-place Piper. This week we learned that *Ercoupe* within a very few weeks will have metal wings to replace the fabric. (Next year may also find a retractable landing gear on the *Ercoupe*.)

The twin-engined, two-control, high-winged, tricycle landing geared, five place, pusher-type *Ercoach* looks like another all-metal job. It will be flying by late summer. Cessna has gone half way and, like the Luscombe, has metal fuselage but may also go to metal wings in the near future.

With hangar space unavailable at too many airports, the all-metal airplane will reduce many maintenance problems for private owners. Our congratulations to the manufacturers who are pioneering this improved type of construction.

FCC CONSIDERS AOPA REQUEST

AOPA in April renewed its effort to have FCC regulations pertaining to the license requirements for aircraft radio stations (and third class radioman's license) greatly simplified. Among the changes which AOPA requested was elimination of the requirement for a periodic frequency check of aircraft radio transmitters. The requirement has been a constant source of inconvenience and expense to non-scheduled flyers who use radio equipment.

Charles R. Denny, acting chairman of FCC, now reports to the AOPA as follows: "The technical staff of the Commission has been studying this matter and is now prepared to make definite recommendations to the Commission. Under the staff proposal, there would be substituted for the periodic frequency check at six-month intervals, now required of licensees of non-scheduled aircraft radio stations, the requirement that such licensees arrange for the measurement of their assigned frequencies only when the transmitter is initially installed —and thereafter whenever any change is made in the frequency-determining elements of the transmitter or there is reason to believe that any assigned frequency may have shifted beyond the tolerance specified by the Commission's rules."

AOPA feels that even the requirement to have a frequency check performed at time of installation is impractical and

(*Continued on page* 108)

"Now I'm Super Power PLUS!"

NEW Mobilgas AIRCRAFT

GIVES FLYING HORSEPOWER

Mobilgas AIRCRAFT

● Today, commercial and private plane operators are getting sensational new gasoline performance—great new take-off, climbing power! . . . heavier load capacity! . . . wider cruising range! . . .

It's *Flying Horsepower*—from new Mobilgas Aircraft! The result of the world's greatest catalytic cracking program!

Recent major improvements in the refining of Mobilgas Aircraft have boosted *Flying Horsepower* performance even above its famous wartime high!

Get the outstanding new benefits of this great aviation gasoline! Get new Mobilgas Aircraft for *Flying Horsepower* — at the Sign of the Flying Red Horse!

SOCONY-VACUUM OIL COMPANY, INC.

and Affiliates: Magnolia Petroleum Company, General Petroleum Corporation

Should You Own or Rent a Plane?

(*Continued from page 31*)

about 175 to 200 hours per year, and at that point it's costing you less per hour to own than to rent at ordinary rates. Further, it's costing you less per mile than any other form of transportation, including auto, train or transport plane. For example, take that $2,700 plane we mentioned before and run it 175 hours. Here's approximately what it would cost:

Annual operating cost	$1,021.00
Cost per hour	5.83
Cost per mile	.051
Cost per seat mile	.025

The annual cost is increased only $249, but look at what happened to the hourly and mileage costs. Down two-thirds. That's what reasonable utilization of your plane can do.

It is especially important when comparing plane ownership costs with automobile costs, as the following table indicates. It reveals that though a four-place plane is initially much more costly to purchase than an automobile, and costs more per hour to operate—yet it is cheaper on a per mile basis if each is used the *average* amount during the year.

COMPARISON OF PERSONAL OWNER OPERATING COSTS FOR THE AVERAGE 1946 FAMILY PLANE AND THE AVERAGE 1946 FAMILY AUTOMOBILE.

	Average five-passenger automobile	Average four-place plane
Selling Price	$1,575.00	$5,145.00
Number of passengers	5	4
Horsepower	120 h.p.	168 h.p.
Cruising ground speed*	29 m.p.h.	140 m.p.h.
Landing speed	....	52 m.p.h.
Operating range	300 miles	500 miles
Payload	....	725 lbs.
Average annual hours of operation	304 hours	200 hours
Average miles operated	8,816 miles	28,000 miles
Costs Per Mile:		
Fuel and oil cost	$ .024	$ .020
Maintenance cost	.007	.011
Hangar or garage cost	.014	.013
Depreciation	.030	.025
Insurance**	.006	.006
Total operating cost per mile operated	.081	.075
Total operating cost per hour operated	2.36	10.57
Total operating cost per year operated	719.00	2,117.00
Estimated down payment required	525.00	1,715.00
Estimated monthly payments (15 months including 5% interest)	75.50	240.10

* Average airspeed increased to allow for national average of 15 per cent less airline point-to-point distances, then reduced 12 m.p.h. to allow for headwinds and maneuvering and taxiing time. Average automobile speed reduced by 11 m.p.h. to allow for normal traffic conditions.

** Insurance for both plane and automobile includes public liability, property damage, fire and theft and specified forms of ground risk including collision: plus fire in flight

Varying cost criteria affect different plane owners differently. To the personal owner using his plane for a limited number of hours per year, mainly for pleasure trips and local flying, the cost factors that loom large are dollars per hour and total dollars per year.

The best way to show personal owner costs is to investigate a few actual examples. Let's take a small contractor who lives in a small city. He might use his plane for four or five business trips each year but for the most part he will confine it to pleasure flying, like summer week-end trips up to his lake cottage 300 miles away. He will take fishing and hunting trips in season with the boys, and will fly locally for fun in off hours, with perhaps a semi-annual 500-mile trip to the big city with the family.

He's a busy man and one reason he wants an airplane is to save a lot of travel time every year. He will be flying only about 150 hours a year and he has a pretty good idea of what his budget will stand. He takes on the average of $11,000 to $13,000 out of his business every year and out of this he's buying his home, running a good car, supporting a wife and two small children, etc.

He figures he can afford around $1,200 a year for operating a plane. But first he will have to make a fairly heavy initial investment over and above his operating expenses—although he'll get around ⅔ of that back if he sells or trades two or three years hence. That other ⅓ is his depreciation cost and he's going to make the bank account stand that, over and above the operating expenses—just as it will have to bear the brunt of the down payment and probably some of the monthly payments too. Out of all this our contractor wants to own and operate a three- and preferably four-passenger plane about 150 hours each year.

Under these circumstances he can afford a four-place plane that will cost in the neighborhood of $5,000. It will be comfortable and may kite along at around 120 m.p.h. His operating costs will look something like this:

Direct Flying Costs

	Per year	Per hour
Fuel and oil	$382	$2.55
Maintenance, parts and overhaul reserve	211	1.41
Hangar rental	360	2.40
Insurance (specified ground risks, fire in flight, all liability)	217	1.44
Total	$1,170	$7.80

During his year's flying of 150 hours he'll cover around 19,000 miles, so his direct cost per mile will be about 6.2 cents. This is about the same as his family car costs per mile, not counting depreciation. But the big thing he's interested in is that the annual outlay is within his budget and the hourly cost is low, because it would probably cost him $12 an hour to rent such a plane and then he couldn't use it for trips because his 48-hour layover costs for a week-end would be exorbitantly high for only five hours of flying.

To buy this plane he'll have to pay around $1,665 down and $233 a month for 15 months thereafter. However, when he trades or sells it, say three years hence, he'll get all except about $2,300 back—which is his depreciation cost. That makes the total cost per year about $1,900.

For this outlay, Mr. Contractor buys 2½ times more transportation than he can ever obtain otherwise in the time at his disposal, extends his scope of activities and interests several times over, and gets a lot more fun and pleasure out of living. Now he can have his lake cottage 300 or more miles up country where his family can stay all summer and where he can fly every week-end. He can knock off at the office at 4 p.m. Friday, get out to the airport and still be at his cottage by 7 p.m. in time for dinner and a restful evening—while by auto he'd be pounding the road till 1 or 2 a.m. In a hundred other ways his activities and pursuit of business and pleasure can be lengthened, winter and summer.

Suppose, however, that our contractor decides that his bank balance can't stand that depreciation loss at the end of a year or two years or whenever he trades or sells the plane, and further that he can afford only about half the down payment and monthly payments. He figures that out of the $1,200 he can take out of his income every year must come an allowance for depreciation. This automatically reduces the price of a plane he can afford to about $3,000.

That means a smaller plane, say a three-place job. It's got 100 h.p. and

15 YEARS AGO

FROM the August, 1931, issue of this magazine:

A three-cylinder, air-cooled engine for lightplanes, called the *Bumble Bee*, had been designed by Henry Lowe Brownback. It rated 25 h.p. at 1,600 r.p.m. and 30 h.p. at 1,800 r.p.m. Weight with all accessories, except propeller hub, was 90 pounds.

Kellett Aircraft Corp. introduced its K-2 autogiro with side by side seating arrangement. Both engines and rotor were fitted with self-starters and there was individual control of wheel brakes, complete instrument equipment, and large baggage compartment. Top speed was 100 m.p.h.

The new Nicholson *Junior* had completed over 200 hours of flight testing with its designer, Hugh C. Nicholson, Jr., at the controls. The single-place plane was equipped with folding wings and was powered by a Szekely SR3-O. Cruising speed was 75 m.p.h.

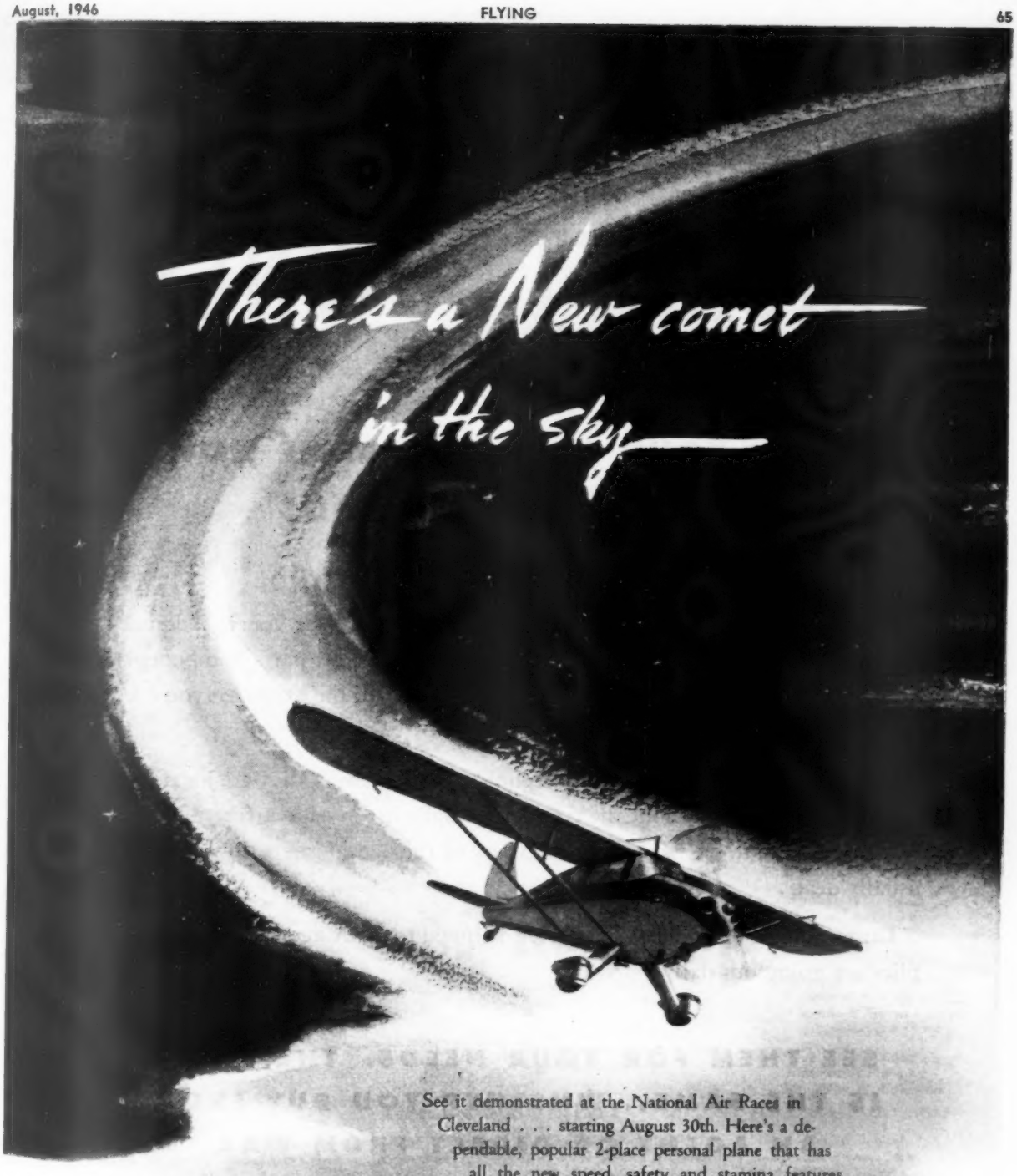
Great Britain had 52 flying clubs but only about 30 possessed and used airplanes. Clubs which couldn't afford to buy aircraft arranged to hire them. Dual instruction was $7.20 per hour at one club; at others it was possible to learn to fly and pass tests for a pilot's certificate for less than $121.50.

The United States took from France the world's non-fueling duration record. Walter E. Lees and Frederic A. Brossy landed at Jacksonville Beach, Fla., with their Packard-Diesel-powered Bellanca plane after having been in the air 84 hr. 33 min. The French record was 75 hr. 23 min.

A new Boeing bomber tested at Dayton had a wing spread of 86 feet and was powered with two 576-h.p. engines. It could carry more than a ton of explosives, four machine guns and a crew of five men.

Eyerly Aircraft Corp. brought out a new lightplane called *The Whiffle Hen*. It was a two-place side-by-side monoplane, powered with a 40-h.p., Continental engine. Price: $1,200.

A contract for 30 fighting planes was awarded to Boeing Aircraft Co. by the Navy Department. Designed for use on aircraft carriers, the F4B-3s were equipped with special arresting gear for landing and their fuselages were of all-metal monocoque construction.



See it demonstrated at the National Air Races in Cleveland . . . starting August 30th. Here's a dependable, popular 2-place personal plane that has all the new speed, safety and stamina features. - Write for full details about a profitable Comet distributorship in your area!

Cleveland Headquarters
STATLER HOTEL
for duration of races

HOCKADAY COMET MANUFACTURING CO.
BURBANK, CALIFORNIA
DEPT. A

AIRCRAFT OWNERS

PARTS FOR YOUR SURPLUS PLANE NOW ARE AVAILABLE NEAR YOU!

Fifty-nine aviation firms have been appointed by the War Assets Administration as agents for the "package" sale of surplus aircraft parts, components, and hardware. They now can supply you with many of the parts that you need to keep flying.

Chosen for their experience and technical "know-how", they are located at strategic points throughout the country to make it convenient for you to fill your needs, and to see what you buy. Many of these are firms with whom you usually deal.

Large quantities of parts have been shipped to WAA agents and new supplies are going out daily.

SEE THEM FOR YOUR NEEDS. THE PRICE IS THE SAME...WHETHER YOU BUY FROM AN AGENT OR DIRECT FROM WAA

If the agents do not yet have what you want, write direct to the Office of Aircraft Disposal, War Assets Administration, Washington 25, D.C. Your order will be given prompt attention.

This is a complete list of WAA Authorized Agents for the sale of aircraft parts:

COMPONENTS:

Aircraft Components Corp.
213 King Street
Alexandria, Virginia

Brayton Flying Service, Inc.
Lambert-St. Louis Airport
St. Louis 21, Missouri

Dothan Aviation Company
Municipal Airport
Dothan, Alabama

Florida Aviation Corp.
CAA Station No. 385
Municipal Airport
St. Petersburg, Florida

Grand Central Airport Company
P.O. Box 1315
Glendale 5, California

The Kratz Corporation
Kratz Airport
St. Louis 21, Missouri

Resort Airlines, Inc.
Box 1301 (Southern Pines Airport)
Southern Pines, North Carolina

Southport Aero Service
Rosemount, Minnesota

Thompson Aircraft Products Co. Inc.
23555 Euclid Avenue
2196 Clarkwood Road
Cleveland 17, Ohio

Lynchburg Air Transport & Sales Co.
Preston Glean Airport
Lynchburg, Virginia

Maxwell Associates, Inc.
15 Moore Street
New York 4, New York

New Mexico Aircraft Sales, Inc.
West Mesa Airport
P.O. Box 157
Old Albuquerque, New Mexico

Northwestern Aeronautical Corp.
1902 W. Minnehaha
St. Paul 4, Minnesota

Piedmont Aviation, Inc.
Smith Reynolds Airport
Winston-Salem 1, North Carolina

Pyrometer Service Company
228 River Road
North Arlington, New Jersey

Briggs Weaver Machinery Co.
309 N. Market Street
Dallas 2, Texas

Simsbury Flying Service
Simsbury, Connecticut

Spartan Aircraft Company
6900 East Apache
Tulsa, Oklahoma

Toth Aircraft & Accessories Co.
220 Richards Road
Municipal Airport
Kansas City, Missouri

AIRFRAME PARTS:

Aircraft Steel & Supply Co.
415-425 N. Water Street
Wichita 1, Kansas

Douglas Aircraft Company, Inc.
Santa Monica, California

Piper Aircraft Corporation
Lock Haven, Pennsylvania

The Ryan Aeronautical Company
Lindbergh Field
San Diego 12, California

HARDWARE:

Aero Bolt & Screw Co.
1815 Webster Avenue
New York 57, New York

Air Accessories, LTD.
100 East Lancester Street
P.O. Box 1326
Fort Worth 1, Texas

Aircraft Hardware Mfg. Co.
810-812 Edgewater Road
New York 59, New York
also 2344 East 38th Street
Los Angeles, California

Air-Parts, Inc.
723 Sonora Avenue
Glendale 1, California

Clary Multiplier Corp.
1524 90 North Main Street
Los Angeles 12, California

Collins Engineering Company
9050 Washington Blvd.
Culver City, California

Durham Aircraft Service, Inc.
Northern Blvd. at Prince Street
Flushing, New York
also Building No. 3
Douglas Plant
Municipal Airport
Tulsa, Oklahoma

General Aviation Equipment Co.
69 Public Square
Wilkes-Barre, Pennsylvania

Globe Aircraft Corp.
North Side Station
Fort Worth 6, Texas

The S. A. Long Company
232 N. Market Street
Wichita 1, Kansas

Parker Service Agency, Div.
The Parker Appliance Co.
17325 Euclid Avenue
Cleveland 12, Ohio
also 6506 Stanford Avenue
Los Angeles, California

Schuster Electric Co.
321 Sycamore Street
Cincinnati, Ohio

The Stanco Company
1914 Canton Street
Dallas 1, Texas

Snyder Aircraft Corp.
5036 W. 63rd Street
Chicago, Illinois

Supply Division, Inc.
Lambert Airport
Robertson, Missouri

Van Dusen Aircraft Supplies, Inc.
2004 Lyndale Ave., South
Minneapolis 5, Minnesota

The Weatherhead Company
300 East 131st Street
Cleveland 8, Ohio

ENGINE PARTS:

Aviation Activities, Inc.
612 Wholesale Merchants Bldg.
Dallas, Texas

Continental Motors Corp.
c/o Continental Aviation & Engine Corporation
76 North Getty Street
Muskegon, Michigan

General Wire & Electric Co.
Dodge Building
53 Park Place (Room 409)
New York 7, New York

Pacific Airmotive Corp.
1628 McGee Street
Kansas City 8, Missouri
also 6265 San Fernando Road
Glendale, California

Ranger Aircraft Engines
Division of Fairchild Engine & Airplane Corp.
Farmingdale, New York

Solar Aircraft Company
2200 Pacific Highway
San Diego 12, California

INSTRUMENTS:

Abrams Instrument Corp.
606 East Shiawassee Street
Lansing 3, Michigan

Eclipse—Pioneer Division
Bendix Aviation Corporation
Teterboro, New Jersey

Jack & Heintz, Inc.
Cleveland 1, Ohio

Kollsman Instrument
Division of Square D Company
80-08 45th Avenue
Elmhurst, New York

Link Aviation Devices, Inc.
Binghamton, New York

Sperry Gyroscope Company, Inc.
Great Neck, Long Island, New York

MISCELLANEOUS:

The G. W. Holmes Company
196-208 East Gay Street
Columbus 15, Ohio

Aero Corporation
Municipal Airport
Atlanta, Georgia

United Aero Service, Inc.
P.O. Box 1028
Delta Air Base
Charlotte, North Carolina

SPECIAL NOTE TO VETERANS: You may use your priority in buying from WAA agents.

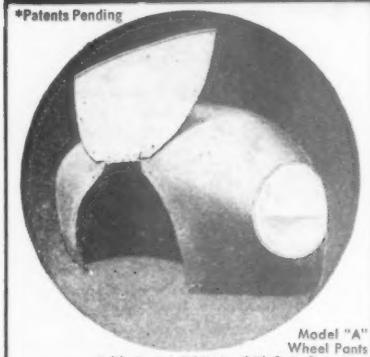
WAR ASSETS ADMINISTRATION

WASHINGTON, D. C.

595

LIGHTSTREAM
WHEEL LIGHTS *

*Patents Pending



Model "A"
Wheel Pants
6.00x6 and 8.00x4..$89 Pair Complete

New Wheel Type Landing Lights can be purchased and installed for a fraction of the cost of conventional lights. Approximately 225,000 candle power in each sealed beam unit. Specify aircraft model, voltage and color. Hinged skirt on pants opens wide for easy tire changing and cleaning.

DEALERS Write today for information Dept. F-1

CHICAGO AIRCRAFT
ACCESSORIES COMPANY
619 W. 74th St. CHICAGO 21, ILL

AMERICAN
AIR
NAVIGATOR

By C. D. Mattingly

An excellent training text written by the chief navigator of Consolidated Vultee Aircraft. In clear, direct language it leads you through every step of a practical training course in aerial navigation — from simple explanations of aerial navigation terms and use of instruments to the more intricate details of dead reckoning, radio navigation, determination of position, stars and weather, special navigation procedures, and the actual steps involved in navigating a 2319-mile flight from San Diego to Honolulu.

Clearly Illustrated

There are 172 diagrams, charts, maps and illustrations (many in color), to help you visualize the applications.

AMERICAN AIR NAVIGATOR has been endorsed by those who teach and those who fly. It is easy to work with, completely indexed and contains 230 pages measuring 8½" x 11". The price is $6.00 at your local bookstore, or direct from the publishers.

ZIFF-DAVIS PUBLISHING CO.
185 N. Wabash Avenue, Chicago 1, Illinois

cruises around 110 m.p.h. Right away his depreciation losses are going to be around $405 every year he operates it so he only has about $800 left for his direct costs and he wants to use it 150 hours!

Direct Flying Costs

	Per year	Per hour
Fuel and oil	$255	$1.70
Maintenance, parts and overhaul reserve	141	.94
Hangar rental	270	1.80
Insurance (all ground risks, fire in flight, all liability)	162	1.08
Total	$828	$5.52

With this plane he still covers over 17,000 miles in his available time every year. That's only 4.8 cents per mile direct cost, 7.1 cents including $405 depreciation.

Let's take another example, a younger man and his wife. He's an engineering draftsman, and earns $4,500 a year. He flew during the war and wants to keep up his flying but his marriage is young and his savings account can't stand too much of a strain. He and his wife want to fly locally, say within 100 miles, mostly for the sheer fun of it, to have picnics and visit that airport with an adjacent fishing stream 90 miles away. That's about 50 hours flying there. He also wants to get summer vacation trips out of it, three or four week-ends during the summer, and at Christmas they want to get up to visit his wife's folks who live on a farm 400 miles upstate. That makes 75 more hours of flying, for a total of about 125 hours a year.

He checks up on the lightplane situation and finds right away that he is limited to the very lowest price plane on the market, even by stretching a point.

Our young draftsman has an even different way of figuring out what he can afford. Fortunately, he lives in a small city, so after paying all necessary living expenses, taxes and allowing for savings, car and house payments, he and his wife decide they can afford $85 per month to run an airplane, including monthly payments on the balance left after making the smallest possible down payment.

Can he do this? Fortunately for our story he can—just about. But only by digging into the money he was able to save during the war to the tune of $1,650. The plane he selects will cost him $2,300 delivered to his local airport. Now let's see what his direct operating costs will look like:

Direct Flying Costs

	Per year	Ave. per month	Per hour
Fuel and oil	$142	$11.82	$1.14
Maintenance, parts & overhaul reserve	79	6.58	.63
Hangar rental	180	15.00	1.44
Insurance (all ground risks, fire in flight, public liability and property damage)	91	7.60	.73
Total	$492	$41.00	$3.94

With his direct costs at $41 he has only $44 per month left for payments. That means making a down payment of about $1,650, allowing for financing charges for 15 months. If he goes to trade or sell that plane, say two years hence, he'll get back around $1,700 of his $2,300 investment assuming normal expected depreciation, leaving about $600 as depreciation loss.

One more example. Let's take a man, a regional sales manager for a chemical firm, whose problem is not so much financial as one of utilization. There will be many such persons. Our man's annual income is something over $20,000 a year.

His company is not going to buy a plane for him but he's got them to commit themselves to paying his actual per mile cost for business only. Besides that, he wants to do some personal flying of his own. For one thing, he thinks he'd like to extend his fishing and hunting trips up to northern Ontario where there's a moose behind every tree. Well, they have airports around there and with his own plane he can make it in less than six hours of flying.

Our sales manager wants to include in his costs depreciation and complete insurance, including all risks in the air. He wants a substantial four-passenger plane with lots of speed and can afford up to $2,000 annually for the estimated 15,000 miles of personal flying that he has in mind. To make the swing around his region 10 times a year plus a few side trips will amount to about 25,000 miles of business flying.

Let's take a look at how his costs would come out, comparing an expensive high-speed plane (A) with a considerably lower priced low-speed plane (B):

	PLANE A		PLANE B	
Price equipped with radio and full instruments	$7,000		$5,300	
Rated horsepower	185 h.p.		150 h.p	
Cruising speed (70% pwr.)	150 m.p.h.		115 m.p.h.	
Miles operated	40,000 miles		40,000 miles	
	Annual cost	Cost per mile	Annual cost	Cost per mile
Fuel and oil cost	$790	$.0197	$850	$.0212
Maintenance, parts and overhaul reserve	435	.0109	470	.0118
Hangar rental	360	.0090	360	.0090
Depreciation	945	.0236	715	.0179
Insurance (all flight and gnd. risks, all liability)	947	.0236	735	.0183
TOTAL	$3,477	$.0868	$3,130	$.0782
Paid by firm for 25,000 miles	$2,170		$1,955	
Cost to sales manager for 15,000 miles	$1,307		$1,175	

The thing that immediately becomes apparent is that our busy sales manager can own a $7,000 airplane for only $132 more per year than a $5,300 airplane. This phenomena is a direct result of that extra speed. And what does this $132 buy? It buys a bigger, roomier plane, more luxurious and more comfortable. It also buys that extra margin of safety when he's trying to beat the weather to the next airport or when he needs badly that extra operating range with full payload. But more important, it buys that thing we don't have enough of on this earth: time. From his personal standpoint he'll be able to make more trips and longer ones. From his company standpoint it's good business too. It costs them $115 more a year for him to operate the costlier plane. He saves around 52 hours a year business flying time so it costs his firm about $2.20 per hour to save that time. However, they pay him $10 an hour so, theoretically, it costs the company about $400 less for their sales manager to operate the more expensive plane. Higher speed is time saved, and time is money. END

"Flightphone"

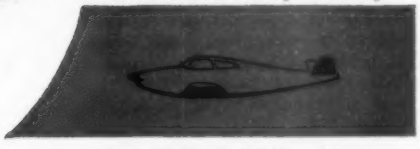
A COMPACT

five channel V.H.F. transmitter

range and broadcast receiver

built-in power supply

directional loop facility



RADIO PACKAGE

all-in-one unit

compact and attractive

modern as a postwar plane!

. . . . planned to blend—become a part of any type instrument panel, Bendix Flightphone* is the answer to personal plane owners and manufacturers demands for a complete, compact, all-purpose radio for weather reports, navigational aids, air traffic control and entertainment.

DESCRIPTION OF THE PATR-10 FLIGHTPHONE

Dimensions behind panel: Depth, 6 3/4"; Width, 6 5/8"; Height, 5 1/8."

Weight: 7½ pounds—complete with shockmounts (including built-in vibrator power supply, V. H. F. Transmitter, medium frequency 2-band receiver, and range filter).

V. H. F. Transmitter Section

Frequency Range: Transmitter provides for remote control operation (push-to-talk switch on microphone) on any one of 5 crystal controlled V. H. F. frequencies between 130.5—132.5 mc.

Power Output: Less than one watt. Provides reliable working ranges up to 75 miles, depending on altitude.

Tuning Meter: Built-in tuning meter located on the front panel indicates individual transmitter circuit currents during adjustments of the transmitter. During normal use of the transmitter, this meter, in conjunction with the PMT-2A V.H.F. antenna, actually indicates radiation of power from transmitter antenna.

Receiver Section

Frequency Range: Two bands, 200 to 400 kc. for reception of control towers, civil airway stations and range stations, and 550 to 1500 kc. for reception of broadcast stations. Provides direction finding facilities when the Bendix manual loop PMN-1 (A or B) is used.

Audio Output: Two watts of audio power is supplied to enable use of a loudspeaker.

Range Filter: A built-in range filter is included for the attenuation of range signals and provides clear voice reception of weather reports and civil airways control.

Loop Switch: Provides for use of the highly sensitive Bendix loop PMN-1 (A or B) as a navigational aid.

PMT-2A V. H. F. Antenna

A vertical antenna rod (approx 22" in length) assembly designed for maximum efficiency at the Very High Frequencies.

Flightweight BENDIX RADIO

REG. U.S. PAT. OFF.

SEE YOUR AIRPORT DEALER OR WRITE PERSONAL AVIATION SALES

Bendix AVIATION CORPORATION

BENDIX RADIO DIVISION, BALTIMORE 4, MARYLAND

WEST COAST BRANCH — 1239 AIR WAY, GLENDALE 1, CALIFORNIA

P.R. for Selling Aviation

(*Continued from page 33*)

and, finally, the cocktail party a primary means of entertainment. What glamorization and ballyhoo have done for the movies needs no description. Millions today consider the motion picture theater as great a necessity as the school or the church.

Fundamentally, then, it is necessary to depict flying incessantly in a way that makes it attractive to the great mass of the public—so attractive and so incessant that it is accepted generally as The-Thing-to-Do.

It has been done very successfully for activities having less potentiality. Barely 10 years ago, bowling was an almost disreputable sport, confined to halls above garages on side streets. Then the industry set out to make bowling The-Thing-To-Do. It took pictures of well-known sports stars bowling and spread them across the country's newspapers. It publicized glamorous new bowling arenas and glamorized the various bowling champions.

Next it lured women. Movie stars were pictured bowling to keep their figures trim. Free lessons were offered to help the sensitive girls overcome their bashfulness. Husband-and-wife leagues were organized.

Bowling teams were formed within factories and offices. Competitions of all sorts were encouraged. Bowling as a scheduled activity was made The-Thing-To-Do for millions who had never been interested in the sport before.

Then children's leagues were formed to keep the kids busy after school—with the blessing of the parents and the schools. Everybody, every week, was bowling — at least the alleys have more than 20,000,000 regular customers as compared with 5,000,000 occasional bowlers 10 years ago. And bowling is after all only a sport.

When the first streamlined trains were built, the railroads resisted buying them. It was the midst of the depression and the lines were economizing. So the manufacturers took their case to the people. They glamorized the streamliners. They got pictures and stories of the sleek, speedy trains into newspapers, newsreels, magazines and movies. They made going by streamliner The-Thing-To-Do. The public overwhelmed the first streamliners with enthusiasm and forced the other lines to put on new equipment in order to compete. Now the streamliner is as well established as the four-wheel brake.

Another instance is the trailer coach. It was born as a hand-made shack on wheels, nailed together in the back yard, to shelter a bed for a vagabond motorist. Even after systematic manufacturers entered the business the public thought of the trailer as a mobile slum, a gypsy's device. Then an enterprising builder sold a few well-known actors and authors custom-made trailers and saw to it that the newspapers and magazines got pictures. Trailers became glamorous, and the average vacationer came to think of them as comfortable conveniences. The result was that before the war more than 45,000 trailers were made and sold in one year — at a cost of from $900 to $5,000 each — which put them in the bracket with private planes.

There are many other examples: vitamin capsules, slacks for women, sunglasses, orange juice for breakfast. All have been made The-Thing-To-Do by clever and continuous publicity programs.

The job to be done for private flying can be patterned with nearly as much precision as a weather chart. First, the problems that hamper the industry must be analyzed, listed and attacked.

Most important is the lingering fear of the danger of flying. This can be alleviated in two ways: presenting the facts that certify flying's safety, and glamorizing safety. Magazine articles on the process of learning to fly and constant publicity on flights without mishap would, by repetitive example, gradually impress on the public the safety of flying.

Another problem is the general belief that flying is more trouble than it's worth. People have read of pilots who set off for Miami and returned after four days of inconvenience without reaching their destination. Play up the convenience of flying. Ballyhoo the advancements in airports and facilities. Tell the story of the businessman who conducts his business in New York, Providence and Boston by flying his own seaplane, and spends all his nights with his family Show how the plane saves another businessman from country roads and poor hotels by enabling him to fly straight to his destination. This calls for finding the men who are doing these things, getting their stories and publicizing them. Few lightplane manufacturers have in their files material on the people who are flying their planes. Yet this is exactly the sort of information that will sell the public.

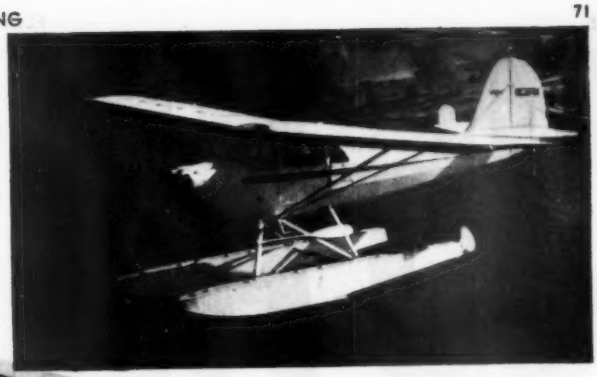
Another major barrier to public enthusiasm is the belief that flying is expensive. While it is true that the average modest income cannot wholly pay for a plane and its upkeep, there remains the large group of above-average prospects, as well as the plane-rental business that enables a man to fly without buying a plane.

Publicity on the costs of flying, emphasizing the savings involved over other methods of travel, is needed. Stories in newspapers and magazines about highly successful salesmen and accountants who fly their own planes would also help Here again it is necessary to find the pilots who are doing these things and get their stories. It can't be done by sitting back and waiting for the newspapers and magazines to find their own stories. This sort of publicity would serve a double purpose — attracting more people to flying, and thereby lowering the cost of flying by enhancing mass produc-

FLYING FAMILY

NOW three Duncans are in the air. As a birthday present, Mrs. Henry Duncan went to her home town, Coffeyville, Kan., and checked out her 16-year-old daughter, Jeanette, on her first solo flight. Mrs. Duncan is a flight instructress at the Pal Waukee Airport, Wheeling, Ill. Jeanette's father is a flyer and has been stationed with the Army in Alaska. Mrs. Duncan has over 2,500 hours, 1,700 spent instructing.

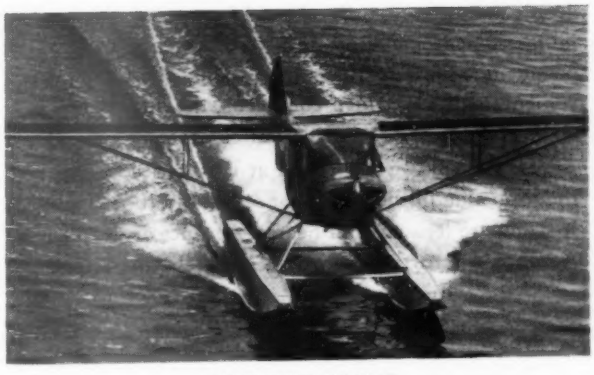
Shipped Daily



AERONCA 65CA

PIPER J3C65

...EDO FLOATS *for these light Planes*



TAYLORCRAFT SERIES B

LUSCOMBE 8C-8D

Edo floats for these four light planes are in volume production. Shipments have been made to distributors and their dealers all over the United States, with others following daily. If you have been unable to find new Edo floats so far, call on your aircraft dealer again. He can take your order now and give you a delivery date.

A couple of hours for installation, and you have all the fun and utility of light-plane flying which only floats can add. It's flight without maintenance worries, too, for Edo all-metal floats take salt water or fresh water year after year in a trouble-free life. Your aircraft dealer can also tell you about delivery dates on Edo floats for additional planes such as the Ercoupe, the Cessna 120 and 140 and the Piper Super-Cruiser.

Edo
FLOATS
FOR UTILITY IN FLYING

EDO AIRCRAFT CORPORATION, 500 Second Avenue, College Point, Long Island, N. Y.

35 AERONCA

YOU'D NEVER EXPECT IN

EVER since the first Aeronca Chief rolled off the line . . folks have been telling us, "This plane is it!" Study carefully the picture at the right . . . and you'll see why. Add up the features. You're sure to agree that . . . on sheer value, Aeronca is way out in front.

Talk about performance! Aeronca climbs at the rate of 500 ft. per minute . . . clears obstacles easily. And, with its low 38 mph landing speed, you can set Aeronca down on almost any small field. Oleo heavy duty landing gear insures safe, smooth landings. In fact, Aeronca is so easy to land and take-off . . . even beginners master these maneuvers after a few practice flights.

NEW FLYING EASE

And in the air Aeronca handles like a dream . . . cruises along at 90 mph—with a range of 420 miles. Finger tip elevator action, ball bearing aileron controls and balanced rudder control all make for easy, relaxed flying. And improved positive action tab control makes "hands off" flying practical! One piece plexiglas windshield — combined with lower cowling — mean *greater visibility than ever before* . . . important in the air — even more important on take-offs, landings and while taxiing . . . truly an outstanding safety feature!

MORE LUXURY

Wide, automobile-type doors afford easy access to the spacious cabin interior. There you'll find deeply upholstered, fully adjustable seats, the latest in instrument panels, a full-sized baggage compartment with cover forming a handy shelf, convenient map and glove compartments and large sliding windows for ventilation comfort.

Yes, sir, any way you look at it Aeronca offers the top value in the field. Just see it—fly it—price it—compare it . . . at your nearest Aeronca dealer's!

Aeronca Aircraft Corporation, Middletown, Ohio

A SIMPLE PULL WITH YOUR HAND from your comfortable seat within the cabin, and Aeronca's new type mechanical starter starts your engine. Almost as easy as stepping on the starter of a car!

THE SMOOTHEST LANDINGS you've ever had, thanks to the heavy duty Oleo landing gear. Another Aeronca feature in the plane designed to give you the most comfort at the lowest price!

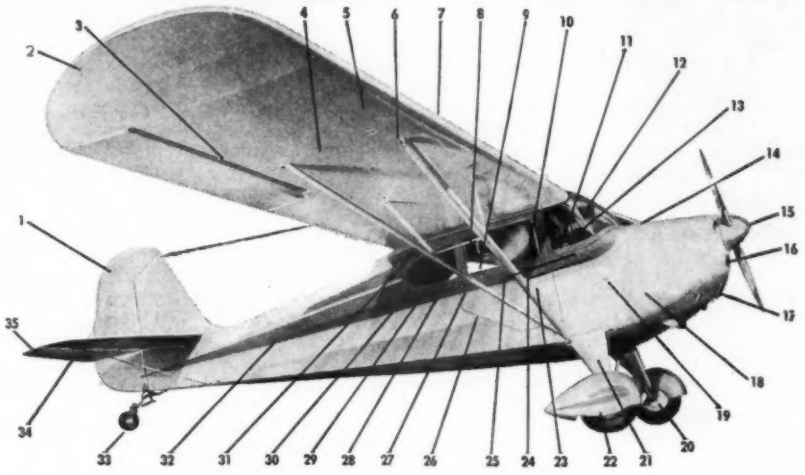
WITHIN EASY REACH, in the smartly appointed Aeronca instrument panel, are the two handy map and glove compartments. A convenient place for maps, gloves, cigarettes and odds and ends.

WITH HER 38 MPH LANDING SPEED, the Chief sets down handily on most small fields. Many farmers and folks in the country find their own pasture provides adequate landing space.

FEATURES....

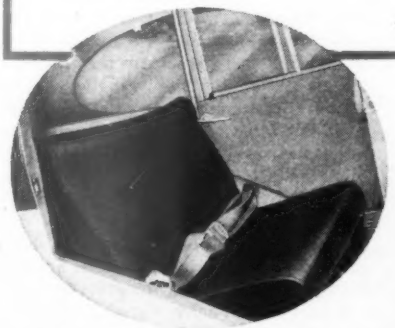
A LOW-PRICED PLANE!

THE AERONCA *Chief*



1. Balanced rudder control.
2. Wiring for position lights.
3. Ball bearing aileron controls.
4. All metal stamped one piece ribs.
5. Modern screw type metal wing fabric attachment.
6. Built in tie down rings.
7. All metal wing nose section.
8. Large sliding windows for ventilation comfort.
9. Luxuriously upholstered cabin interior.
10. Dual wheel control.
11. Two handy map and glove compartments.
12. Clear vision, one piece, plexiglas windshield.
13. Beautifully appointed, automotive type, instrument panel.
14. Fiberglas, heat resistant sound proofing aft of engine compartment.
15. Attractive streamlined propeller hub spinner.
16. Pressure type cooling.
17. Air Maze carburetor filter assembly.
18. One piece steel engine compartment bulkhead.
19. Cabin ventilator.
20. Automobile, lever type, positive action parking brake.
21. Famous Aeronca heavy duty oleo landing gear.
22. Graceful wheel pants (extra equipment).
23. Cabin operated, new type, mechanical starter.
24. Two automotive type fuel gauges.
25. Cabin heater.
26. Easy cabin access.
27. Two large, automobile type, pressed metal doors.
28. All steel, deeply upholstered, side-by-side, fully adjustable seat.
29. Spacious baggage compartment with cover forming a handy shelf.
30. Twenty-three gallon long range fuel capacity.
31. Streamlined steel adjustable wing struts forward of door.
32. Streamlined fairings.
33. Steerable tailwheel.
34. Airline type trim tab.
35. Finger tip elevator action.

Parts for the Chief and the Aeronca Champion (Tandem model)—both of which are now in full production—are 80% interchangeable—a great economy feature!



NOTE THE SPACIOUSNESS OF THE CHIEF'S CABIN. No hunching or crowding. You sit comfortably, relaxed in deeply upholstered seats. Baggage out of your way in large compartment in rear. Wide sliding windows provide ventilation to your taste.

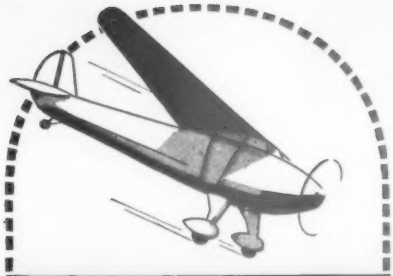
SO SAFE—SO SIMPLE—NOW ANYBODY CAN FLY AERONCA!

(Thousands solo in 8 hours or less)

AERONCA

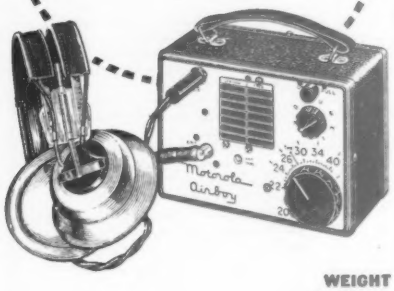
America's No. 1 Low-Cost Plane

Over 1000 Aeronca Qualified Dealers
to serve you at handy airports all over the U. S.



Motorola
"AIRBOY"
portable
aircraft
radio
receiver

- The perfect standby set
- The ideal emergency receiver
- Take it home for weather information, etc.



WEIGHT
4 lbs.
COMPLETE WITH BATTERIES

Size 6" x 4" x 3" • 4 tubes • Portable—self-contained "Shielded" antenna and housing • Designed for typical aircraft antenna • Sensitivity 7 microvolts—range 100 miles • RECEIVES BEACON, WEATHER TOWER.

RECEIVER ONLY..... $31.00
COMPLETE WITH HEADPHONES AND BATTERIES $39.95

See your nearest dealer or write—

GALVIN
MANUFACTURING CORPORATION
4545 AUGUSTA BLVD • CHICAGO 51

tion and increasing ground facilities.

Millions of people who think nothing of stepping into a car and starting off on a cross-country trip have the feeling that they could never learn to fly. Traveling off the ground still is something miraculous to them, something not to be mastered by a man-on-the-street. Also, they've read about the 14-month training courses given to service pilots, involving intensive courses on engines, aerodynamics and navigation, to say nothing of the requirements of 20-20 vision and "steel" nerves.

Here again, the needed technique is to show how thousands of ordinary men have gone through routine training and mastered flight without mental prostration or supermen physiques. It's hard to believe this today, but around 1910 the automotive industry had a major problem in getting prospective buyers to learn to drive. It was the constant exposure of the public to their neighbors' driving that sold ability to drive.

The last major obstacle to public acceptance today is the shortage of airport and maintenance facilities. The man in a small town without an airport, or the city man who wants to reach such towns, recognizes the impracticability of owning a plane under those conditions.

Here the solution is not in overcoming the public's belief but in rectifying a condition. It is important for the private plane industry actively to stimulate development of community airports, to encourage private capital to invest in fixed-base facilities, and to present an attractive picture of future aviation.

Full development of the automobile industry had to wait for the building of good roads and an adequate network of service stations. The public that bought automobiles clamored for better roads so the industry did not have to make the fight alone; public opinion led legislators to appropriate funds. The gradual advance of the automobile attracted small businessmen into the garage and filling-station business. These favorable factors are not likely to help the lightplane industry at this stage. The advantages of the airplane must be demonstrated to the public before it will clamor for the necessary facilities — and the big investment required to build a good private airport seems too much of a gamble to anyone who is not convinced already that a big market exists for private planes.

This leads to an obstacle within the industry itself that can be removed by publicity of the right sort. Despite its relative youth and the vast areas for expansion, the lightplane industry today displays a lack of confidence in itself that, as much as anything else, is holding it back.

These points outlined above cover the major obstacles which can be combatted by a sound campaign of public relations and publicity. Now let's consider the positive approach, not intended to overcome prejudices and misconceptions but to instill favorable opinion.

This calls for two techniques: *glamor* and *logic*. Flying can be made glamorous by broadcasting pictures of movie stars standing beside their planes — four-color covers on the fan magazines and other mass-circulation publications, in the rotogravure pages of the newspapers, in the newsreels. The opera singer who flies between his Long Island home and his Maine summer cottage, the champion golfer who flies to and from tournaments, the radio star who makes flying his hobby — all can be shown with their planes to interest the general public through the example of the glamorous personage: testimonial stuff again. This, combined with the publicity on average-man flyers, could make flying The-Thing-To-Do for the millions who perhaps unconsciously copy their interests from the neighbors.

Special efforts should be aimed at women and teen-agers as groups. Glamor pictures of flying movie stars and other well-known women, stepping out of their planes in neat and spotless suits, not only would stimulate the desire to emulate, but would convey the impression that flying is clean and feminine — that the days of goggles and oil-smeared denim jumpers are gone. The fact that flying is easy must be emphasized, and the social prestige of owning one's plane must be cultivated. Women can be sold on flying if they are convinced it is The-Thing-To-Do, feminine and clean, easy and a means of keeping in style.

No group is more enthusiastic about flying than the high school youngsters. True, few of them can buy planes today. But they all influence the buying ideas of their families and if they are sold on the practicability of a plane for their families they'll put on terrific sales campaigns to get one. Also, youngsters grow up to become the money-makers who *do* buy planes—if their enthusiasm has been kept alive.

The industry should popularize lightplanes and flying through the magazines that reach the youngsters — in advertisements, in publicity material, in contests. They should work closely with the high schools and colleges to provide good courses on primary aviation. They should organize aviation clubs in the schools, YMCAs, churches and everywhere that youngsters gather. Everything that stimulates the youngster's enthusiasm also will help build a sound future for private aviation.

The *logic* technique involves straight reportorial material intended to show the public the valid reasons for flying's popularity. This again brings in the traveling salesman, the summer vacationer, the economy features and the safety. Carried on at the same time as the glamorizing, this would serve to balance the publicity campaign and avoid giving the impression that flying is only for the wealthy and the famous.

Getting material of this sort into places where the public will see it calls for skill and judgment. Finding the story-material that makes publicity comes first; then imagination develops it into interesting features; and knowledge of the media determines where and how it will be placed where the public will be impressed by it. There are no mysteries, no secret codes

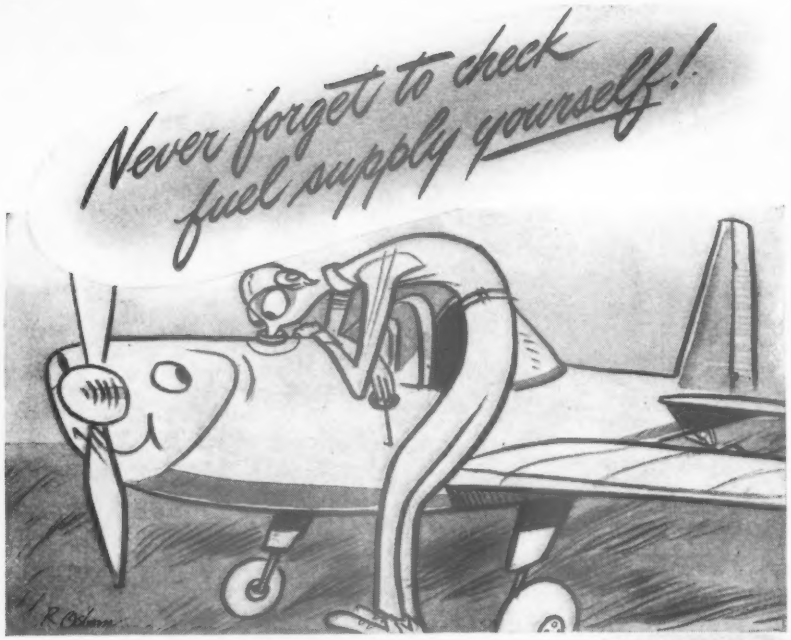
AS NEAR AS YOUR NEAREST AIRPORT

Because of their advanced design and construction, Continental Red Seal Engines run longer between major overhauls. But when that overhaul is needed, or when minor repairs become necessary, you'll be glad you have a Continental.

Continental service and parts are as near as the nearest airport. Wherever you fly, you'll find this great service organization waiting to serve you. It's an added reason for the reliability of Continental Engines in day-after-day flight.

Be sure to specify **genuine** Continental parts! **Genuine** Continental parts provide more reliability, more security. They're available from hundreds of depots all over the United States.

Continental Motors Corporation
Aircraft Engine Division
MUSKEGON, MICHIGAN



ALWAYS REMEMBER your fuel supply—
a small detail, but your life may depend on it!
Always *know* by checking it YOURSELF.

Never forget your CALOBAR
SUN GLASSES
OPTICALLY GROUND

ALWAYS REMEMBER that your Calobar Sun Glasses can help you avoid some of flying's most hazardous situations—those which arise from dazzling sun glare. For, while admitting plenty of "seeing light," Calobar Sun Glasses guard your eyes against blinding light.

Specially formulated to absorb both infra-red (heat) rays and ultra-violet (sunburn) rays, Calobar Sun Glass lenses are *optically ground and polished*—a further refinement of great importance. Mounted in sturdy Ful-Vue frames, Calobar Sun Glasses give you wide range of vision and *comfort!*

Now available in limited quantities through those who render professional eye service and also from airport sources.

American Optical
COMPANY
World's largest makers of ophthalmic materials

about it; other industries are doing it constantly.

Getting such a program under way could be easy and quick, if every one concerned will co-operate. It requires only that someone — perhaps a trade association — bring together plane manufacturers, engine and parts manufacturers, flying schools, fixed-base operators and others who will benefit, to create a pool to cover the cost. A committee can be appointed to supervise the program and the expenditures. For the first year $50,000 could go a long way — a small sum as far as most promotion expenditures go.

Most important will be the selection of the man or organization to plan and conduct the campaign. Whether it is someone who is put on the committee's payroll and selects a staff to work with him, or an agency already established which can be supervised closely by the committee, the right choice will start the industry toward its place in the sun. The whole thing could be underway in less than 60 days. By co-ordinating with the individual firms' publicity and advertising programs, fullest benefits can be assured. If all individual manufacturers' advertisements, for instance, follow the themes laid down by an industry-wide publicity program — using glamor to stress safety and other points — the accumulative effect will be greater and the desired results will come faster for all manufacturers. Instead of each firm continuing to sell its own plane — and often trying to sell that plane by ads in general magazines to people who have not yet been sold on the desirability of flying —the whole industry would be selling private aviation and the manufacturers would still get their individualized sale benefits.

This procedure is being followed successfully by the commercial airlines' Air Transport Association, which has a 1946 budget for public relations activities estimated at $500,000. There is no question that this campaign has helped to make the public air-travel minded. Individual airlines continue to attract the interested customers to use their own facilities. Similar campaigns, costing from $12,000 to $1,500,000 a year, are being conducted for such diversified industries as ice, railroads, radios, laundries, gas, wax paper, homes, jewelry, wirebound boxes and scores of other things.

Making private flying a new segment of American life is very possible with the facilities already available. This can mean a billion-dollar industry, thousands of jobs, new horizons for millions of families, a big step toward a better way of life. Even if moderately successful, it would speed up the growth of the private aviation industry several times its current rate — an accomplishment worth many times the amount invested in the campaign.

Private flying is traveling at stalling speed without aggressive promotion. If it's going to make progress it will have to work hard for public enthusiasm. It's time to make a small investment, with solid-gold returns as the reward for success. END

LOOK TO PAC FOR *Complete* SERVICE

ENGINES:
PAC engine shops are the finest in theWest. Manned by A. & E. professionals, tools and jigs will handle anything from 65-horse engines that power America's private fleet to the biggest power plants in commercial or military operation. Yet, prices are low.

AIRFRAMES:
Re-covering a damaged rudder surface or reconverting a large airliner is all the same. Every job, small or large, gets the same careful attention.

PROPELLERS:
The whole propeller range can be accommodated in our "prop" shop. Overhauling, testing and balancing equipment meets every manufacturers' specification. Much of it, built ourselves, far exceeds manufacturers' requirements.

ACCESSORIES:
Magnetos, radios and starters are all service specialties in our accessory repair shop.

PARTS & SUPPLIES:
PAC, as distributor and representative for nearly 300 of aviation's leading lines, offers the finest selection and stock in the field.

★ ★ ★

PAC bases are strategically located from Alaska to Mexico—from the Pacific to the Mid-west. When you deal with PAC you take advantage of experience, equipment and stock of aviation's oldest and largest airplane service and supply house.

PAC

PACIFIC AIRMOTIVE *corporation*

BURBANK	OAKLAND	SAN JOSE	FRESNO	GLENDALE	SAN DIEGO	KANSAS CITY	SEATTLE	ANCHORAGE
Lockheed Air Terminal	Oakland Airport	Pacific Airmotive Airport	Chandler Field	6265 San Fernando Rd.	544 7th Ave.	1628 McGee St.	P.O. Box 272 Kent	Alaska

The Ercoupe

(*Continued from page* 34)

slipped—a point on which most of the anti-*Ercoupe* campaigns have been based. Test pilots at one of the largest lightplane factories told me they simply refused to fly the *Ercoupe* owned by their company in any wind except head-on. Cross-wind landings and take-offs, they insisted, are "much too dangerous."

Truth is that the *Ercoupe* is at least as safe under those conditions as any airplane flying. I have flown one in a gusty 25-30-m.p.h. cross-wind (about 45° off the nose), and have made a series of landings and take-offs under those conditions, although every other lightplane on the field was grounded because of the wind condition. The answer to this pilot-puzzler is that the pilot must learn to fly the airplane in the manner to which it, not he, is accustomed. And until he makes up his mind to that, the old-timer is the most dangerous of all *Ercoupe* pilots. One of the safest *Ercoupe* pilots is the middle-aged businessman who learned to fly *Ercoupes* right from the beginning, and who has no aeronautical inhibitions one way or another.

A cross-wind landing in an *Ercoupe* goes like this: the glide is established at about 70 m.p.h. indicated. After the turn is made from the base leg to final approach, the airplane is flown on a heading straight down the runway, but with the plane's nose pointing into the wind. The pilot's most important function is to keep the wings level and the nose up, in much the same attitude as is used with conventional aircraft. As the airplane approaches the ground the pilot should flare off in the usual manner, holding the wings level. The experienced pilot instinctively wants to turn the wheel so that the plane's nose points down the runway—and that's the worst mistake he can make. When he turns the steering wheel, he not only operates the ailerons and rudders, but the nose-wheel as well. If the airplane lands with the nose wheel turned to one side, it will either ground loop or knock the wheel off entirely.

The actual touch-down as it is in normal *Ercoupe* landings, must be made on the two rear wheels first. The instant they touch, the *Ercoupe's* momentum and center of gravity cause the airplane to swing its nose directly onto the actual flight path. The nose wheel then settles onto the ground and the plane is steered like an automobile.

Note that one point: the *Ercoupe* should be landed nose high, in just the same manner as a conventional plane. Touch-down air speed should be between 50 and 55 m.p.h. The airplane can be flown on at as high as 90 m.p.h. in an emergency but high-speed landings obviously should not be used regularly. Some flight instructors, inexperienced with *Ercoupes*, have been teaching their students to fly the plane onto the ground at 60 m.p.h. or more and in level flight position.

There probably are more *Ercoupe* accidents during taxiing than anywhere else. The plane is so easy to taxi that a pilot tends to sit back and relax while zipping across a field too fast, dodging around ground hazards just as he does with his automobile in traffic, and slamming on the brakes whenever and wherever he pleases. The result is that *Ercoupes* are always breaking nose wheels in holes or ditches, wings are being dented and smashed and—when the brakes fail occasionally—propellers are cracked when the plane rolls into something. The insurance companies, as a result, pay many small claims on *Ercoupes*.

Because there are no rudder pedals, the pilot simply sits with crossed feet while he flies. He does have a single foot brake pedal, almost exactly like his automobile brake, for use in taxiing and after landing. The throttle is the conventional sliding rod on the instrument panel, between the two control wheels. There is a parking brake beside the throttle. The starter button is at the top right center of the panel and is pulled out to start the engine.

In the take-off, the *Ercoupe* is simply steered down the runway, automobile-fashion. When the air speed reaches about 60 m.p.h. the control wheel is eased back and the airplane climbs away at a steep angle. The *Ercoupe* I flew in this instance—NC-87044—took off from Pal Waukee Airport (640 feet above sea level) near Chicago in 10 seconds. Our gross weight was 1,268 pounds—eight pounds over the present limit. The manufacturer, however, already has applied to CAA to have the plane's gross weight increased to 1,400 pounds.

Weather conditions for this flight were: temperature, 44; dew point, 27; wind, ENE 16; and altimeter setting, 29.35. We carried the maximum fuel load, 23 gallons.

Although the manufacturer claims a rate of climb of 750 f.p.m. for the first minute, the airplane I flew climbed the first 1,000 feet at 800-810 f.p.m. (I recently climbed another to 13,000 feet at an average rate of 417 f.p.m.) Indicated air speed in the climb was 70 m.p.h.; the engine was turning 2,350 r.p.m. Once cruising altitude was reached I levelled off and started to trim the plane for level flight. The trim on all but the very latest *Ercoupes* is done with a bungee spring attachment on the elevator controls. This trimming device is so bad—and its users objected to it so violently—that a new trim tab was devised and now is being installed. But the bungee is on the majority of *Ercoupes* in use at this time. It is operated by a small crank on the instrument panel, which must be cranked innumerable times to achieve any trim at all—the pilot, meanwhile, thoroughly skinning his knuckles on the carburetor-heat and mixture-control knobs nearby. The new trimming device is on the left wall of the fuselage, and consists of a small throttle-like knob that moves easily in the direction that trim is desired, operating a slender hinged tab.

In the air, the *Ercoupe* is unusually maneuverable. Tight, fast turns are easily made. Despite the absence of rudder pedals, the airplane makes perfectly co-ordinated turns just by turning the wheel and holding a little back pressure. Though it was designed primarily for straight-and-level cross-country flying it can be looped out of level flight, can be slow-rolled, do Immelman turns and Cuban eights. The only things it can't do are spins, uncontrolled stalls, or slips.

Visibility is excellent, both in the air and on the ground. The pilot can see in every direction except straight down. Only in the flare-off for touch-down does the nose come up so high that the pilot cannot see straight ahead.

The manufacturer says the current model will cruise at 110 m.p.h. I flew a 75-h.p. *Ercoupe*—NC-87029—approximately 1,800 miles early this year, cruising at about 2,375 r.p.m. Average ground speed for the entire trip worked out to 108 m.p.h. Fuel consumption was just over five gallons per hour.

The *Ercoupe* stalls at about 48 m.p.h. It is not a stall in the customary sense of the word; the airplane is always under control and the pilot can maneuver easily, with no fear of the plane falling off out of control. At minimum speeds it mushes downward with complete

The GOLDFISH CLUB

The Goldfish Club was formed in order to give recognition to the thousands of pilots and aircrewmen who have ditched their aircraft or bailed out at sea and have saved their lives through the use of life jackets or dinghies. Army, Navy and Civil Air Patrol personnel are eligible for membership. To apply, the following information should be submitted to the American Secretary, Max Karant, Managing Editor, FLYING, 185 North Wabash Avenue, Chicago 1, Illinois:

1. Name, rank and serial number
2. Service address
3. Home address
4. Date and location of incident
5. Description of incident
6. Signature of applicant
7. Signature of commanding officer

A listing of the Club members, a regular feature in preceding issues, is continued below:

221. Joos, Edward, M
222. Terrell, Roy A., Jr., M
223. Batten, Robert A., M
224. Ross, Thomas "J," M
225. Howard, Arthur W., M
226. Miller, William C., M
227. Vinci, James A., M
228. Castle, James H., N
229 Hefford, Irvin L., N
230 Eastman, Lawrence E., A
231. Spence, Julius B., A
232. Baier, Joseph L., A
233. Kelly, Thomas L., A
234. Gompf, Jack W., A
235. Hawkins, Everett Lynn, N
236. Lloyd, Robert Jabez, N
237. Mitchell, Ernest Henry, N
238. Colgrove, Calvin Clarence, N
239. Thomas, Edward Benjamin, N
240. Gissible, Raymond W., N
241. Kahn, Albert, A
242. La France, Armand J., A
243. Harper, Leo L., Jr., A
244. Harris, Dan D., A
245. Rush, Earl R., A

A—Army; N—Navy; M—Marine.

FIRST AIRLINE to announce the purchase of the Sperry A-12 Gyropilot with Automatic Approach Control is United Air Lines . . . for its new Mainliner "230's"

NOW! . . . SPERRY MAKES AVAILABLE

Automatic approach control

AS A STANDARD ACCESSORY TO THE SPERRY A-12 GYROPILOT*

● Following years of intensive development and thorough flight testing, Sperry is now producing an Automatic Approach Control as an accessory to the Sperry A-12 Gyropilot.

With this equipment, signals received from the Cross Pointer Meter are interpreted in terms of turn and climb and descent which the A-12 Gyropilot uses in guiding the aircraft automatically to the landing beam and keeps it there without oscillation or hunting. The degree of stabilization provided by the A-12 Gyropilot at approach speeds makes the Automatic Approach Control highly effective.

The Automatic Approach Control is being produced with the same integrity of design and dependability of performance that characterize the Sperry A-12 Gyropilot.

Incorporating this Automatic Approach Control as a standard accessory to the Sperry A-12 Gyropilot is a notable forward step toward completely automatic flying. It permits development of new operating techniques which will result in improved schedule reliability.

Upon request our Aeronautical Department will be glad to supply further information.

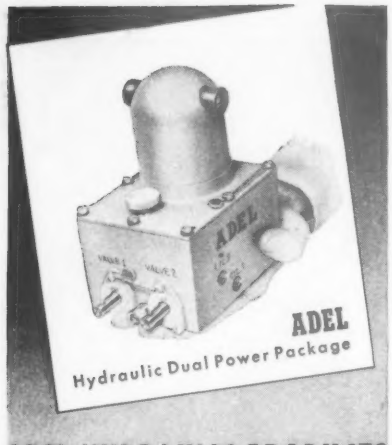
*TRADE MARK REG. U. S. PAT. OFF.

Sperry Gyroscope Company, Inc.

GREAT NECK, NEW YORK • DIVISION OF THE SPERRY CORPORATION

LOS ANGELES • SAN FRANCISCO • SEATTLE • NEW ORLEANS • CLEVELAND • HONOLULU

GYROSCOPICS • ELECTRONICS • RADAR • AUTOMATIC COMPUTATION

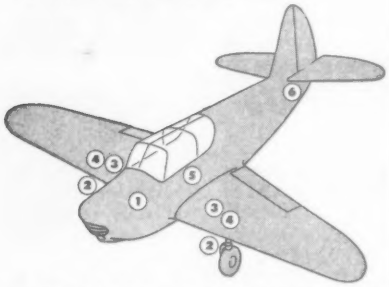


ADEL HYDRAULIC PRODUCTS FOR LIGHT PLANES *mean...* SAVINGS AND EXTRA DEPENDABILITY!

ADEL has a war-time record of development and manufacture of hundreds of thousands of efficient, dependable aircraft controls and parts.

ADEL Dual Power Package shown above combines in one compact unit eleven hydraulic system elements providing a complete hydraulic pressure and control system for light plane retractable gear and flap systems. It is built to the same internationally respected quality and precision standard of Adel military aviation equipment — combat proven on every battle front of the war.

Manufacturing plants in Huntington, W. Va., and Burbank, California. Represented in Canada by Railway & Power Engineering Corporation, Ltd.



ADEL LIGHT PLANE PRODUCTS

1 HYDRAULIC DUAL POWER PACKAGE
2 MAIN LANDING GEAR SHOCK STRUT
3 MAIN LANDING GEAR ACTUATORS
4 MAIN LANDING GEAR DOWN-LOCK
5 HYDRAULIC FLAP ACTUATOR
6 TAIL STRUT SHOCK ABSORBER

ADEL
PRECISION PRODUCTS CORP.

address all inquiries to:
10513 VAN OWEN ST., BURBANK, CALIF.

aileron control at all times. Even if the pilot continues to hold the wheel full back, the airplane automatically drops its nose slightly below the horizon and picks up minimum speed. If a gust should drop one wing at this slow speed it can be brought back to level position instantly with aileron. An obvious danger, then, would be found if the pilot suddenly lost his head and kept the *Ercoupe* in a stalled position within, say, 200 feet of the ground. In dropping its nose to pick up speed the plane could, of course, hit the ground in a shallow dive. This actually has happened a few times and in each case the airplane was pretty badly damaged. But what few injuries there were, were minor; there were no fatalities. Obviously, we must assume that the *Ercoupe* pilot—like any pilot, motorist or even a bicycle rider—will use a certain minimum amount of common sense. They have an appropriate slogan at the Erco plant: "As a last resort, use judgment." But as airplanes go, the *Ercoupe* forgives more boneheaded mistakes than will most planes.

This business of not being able to slip the *Ercoupe* warrants examination. There are three ways of losing altitude in an *Ercoupe*, each quite safe. One is to pull the nose up into the stalled position and hold it there. The airplane will settle rapidly toward the ground—but always under control. This mushing should be stopped by the pilot whenever he feels he is close enough to the ground to make a normal approach and landing.

The second method, to be used when a considerable amount of altitude is to be lost, consists of pulling the nose up steeply to the stall position, then turning the wheel from far left to far right rapidly, all the time holding it hard back. This produces a falling-leaf type of maneuver and a considerable amount of altitude can be lost quickly this way during a high approach to a field.

These two methods can be used by the *Ercoupe* pilot whenever he feels like it. The third method, however, is for emergencies only. In it, the airplane is simply dived down into the field desired (assuming, for example, that the engine has quit entirely), levelled off just above the surface, then deliberately flown on at any speed from 50 to 90 m.p.h. The brakes can be applied as soon as the plane is on the ground. I have made such landings at 80 m.p.h. with no difficulty whatever. Brakes should be used with care at such speeds but they can safely be slammed full on in case of emergency.

Accessibility to the cockpit is good. The pilot and passenger step up on the wing, open the sliding hatch, step first onto the seat, then down on the floor. The hatch panels then are slid back up on each side until they join the transparent green sunshade panel at the top. These panels are made of a light plastic, as is the windshield. They are easily scratched. The hatch panels have an annoying tendency to vibrate open in flight and the manufacturer has tried several locking devices in attempts to solve the problem.

Once the amateur flies an *Ercoupe* he will find that it's not nearly as bad an airplane as it's been made out by the "experts." Actually, it couldn't be *that* bad, even if it weren't the superb engineering job that it is. Despite the anti-*Ercoupe* whispering campaign that has been so prevalent, Erco is turning out 22 planes daily and has a long way to go to catch up with back orders even though the price of $3,150 is quite a sizeable amount to have to pay for any two-place 75-h.p. lightplane.

If it hasn't done another thing, the *Ercoupe* has established the two-control airplane once and for all. Erco has a twin-engined, five-place, two-control plane in the works now. At least one manufacturer of transport aircraft is giving serious thought to adopting the two-control system for his transports. But it will continue to be a hard fight. Nothing new has ever come to aviation without old-timers fighting it. —MAX KARANT

FLYING

"That man about the tricycle landing gear is here again."

test pilots on the ground

Telemetering — the instantaneous transmission of flight information to instruments on the ground — has opened new fields for obtaining scientific data on objects in flight. Whether piloted or pilotless, their exact behavior can be accurately determined during the entire flight, providing the engineer with information for further research and development. Combined with newly developed electronic control devices, this achievement of Curtiss-Wright research represents another advance in the era of supersonic flight.

FIRST IN FLIGHT

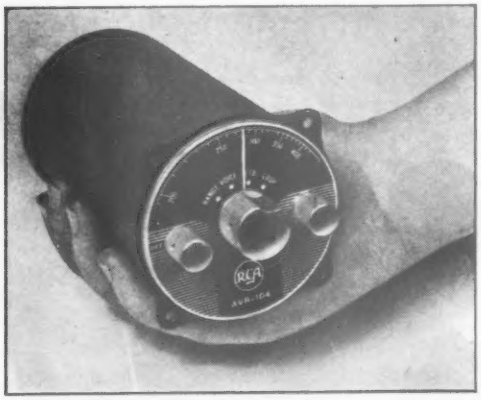
CURTISS WRIGHT

Airplane Division

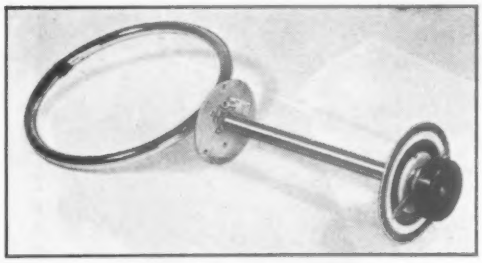
COLUMBUS, OHIO

Developing Flight to Meet the Future.

RCA Transmitter AVT-III. Light, compact, powerful, efficient—ideal for the light-plane owner who wants a dependable two-band transmitter at a low price.



RCA Receiver AVR-104. Exceptionally small size—mounts in standard panel instrument hole. 200-415 kc band, 278 traffic control position, built-in range filter.



RCA Loop Antenna AVA-129. Light weight, directional and rotatable antenna, for use with any RCA Aircraft Radio Receiver for radio-direction finding and air navigation.

RCA presents

a complete radio system for the light plane

Here it is—a complete radio system—built by RCA—to bring to the light-plane flyer two-way radio communication with a rotatable loop antenna for radio navigation.

You'll be "on the air"—in the air—with RCA's compact two-channel AVT-111 Transmitter, with fixed or trailing antenna, on 3105 or 6210 kc.

The AVR-104 Receiver occupies only a standard panel instrument mounting space and covers the 200 to 415 kc range. It has a 278 kc fixed-tuned position for reception of traffic control instructions. Power supply and IF-Audio units can be mounted in any convenient place in the plane . . . cable lengths are not critical.

The chromium-plated AVA-129 Loop Antenna mounts on top or bottom of the aircraft fuselage—and provides a double check on course flown as well as guidance off the airways. Cross-country flight can be undertaken with real confidence—cross-bearings make it easy to fix position at any time.

You'll want to know more about this modern light-plane radio "family." For detailed specifications and the complete story *write today* to Dept. 34-H.

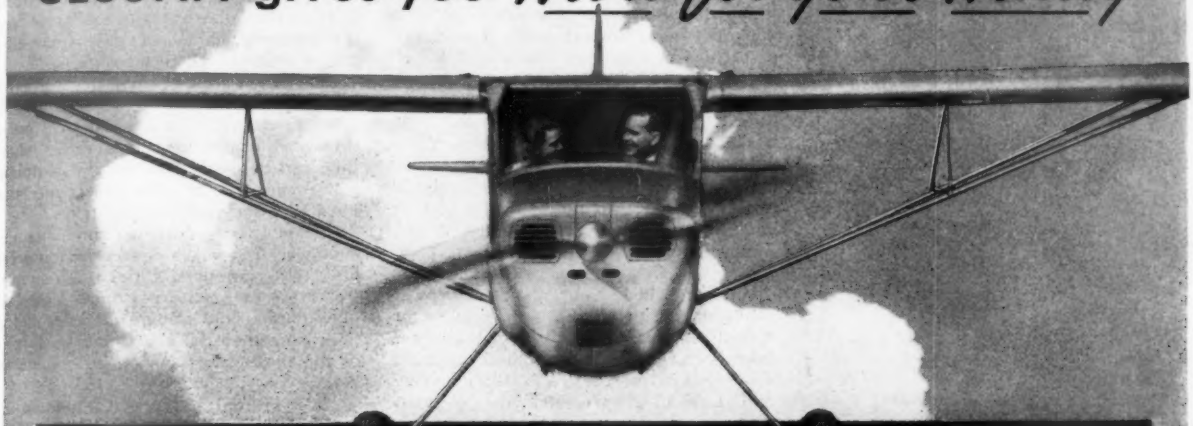
AVIATION SECTION

RADIO CORPORATION of AMERICA

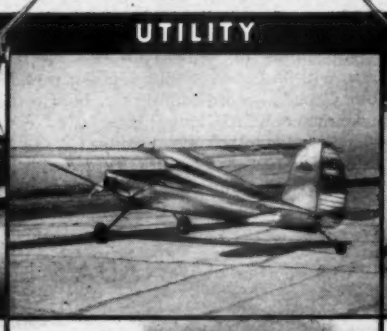
ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N.J.

Everyone who flies the 140 agrees . . .

CESSNA gives you *More for your Money*



As One Veteran Flyer Says, "The 140 is more comfortable than most big planes I've flown." Roomy, adjustable seats and relaxed leg position take care of that.



Taxi in High Winds that ground most light planes. The 140's safety gear and steerable tail wheel make it safe. And the flaps can be set for any desired angle of glide.

The Patented Cessna Safety Landing Gear actually combats normal ground looping tendencies. It smooths out rough fields, and has no moving parts to rattle or wear.

You Can Take Ample Luggage for two people for ten days. There's room for 80 lbs.... 2 large suitcases and 2 brief cases or 3 suitcases... plus handy utility shelf.

A 5 Hour Maximum Range assures over 4½ hours or 450 miles nonstop flying in the 140. Top speed is over 120 m. p. h. and twin wing tanks carry 25 gallons of fuel.

You'd Never Think of driving a car that didn't have good, sturdy all-metal construction. That's equally important in an airplane. Another reason why Cessna's the buy.

Cessna Alone Gives You All These *High-Priced* Features In The *Low-Priced* Field

You be the judge. Just compare the sleek, fast, 2-place Cessna 140... feature for feature... with any other airplane at anything near its low price of only $3245 (F. O. B. Wichita). Or the Cessna 120... also with an 85 H. P. Continental engine, all-metal structure, man-sized hydraulic toe brakes, patented safety landing gear, and service ceiling of 15,500 feet... but without starter, generator, battery and flaps for only $2695 (F. O. B. Wichita). You'll discover for yourself that Cessna does give you more comfort, utility, safety and performance . . . *more for your money.*

CESSNA AIRCRAFT COMPANY, DEPT. F, WICHITA, KANSAS

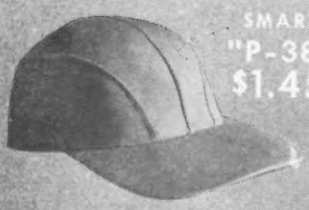
Cessna
THE PILOT'S AIRPLANE

ARMY E NAVY

NEW
PILOT CAPS

DELUXE
"P-80"
$1.95

SMART
"P-38"
$1.45



New "P-80" & "P-38" . . pilot caps feature a wider and longer visor for complete sun protection. Three seam construction, low cut back and perfect fit. Made of the finest suntan Chino Cloth, with leather sweat-band and taped seams.

Also available are the new "SUN VISOR" pilot caps having a wide, long visor and of the same fine construction ..... $1.25.

WIRE OR WRITE YOUR ORDER TODAY!
SIZES 6¼ TO 7⅝.
SEND ONE-THIRD DEPOSIT WITH ALL CAP ORDERS.

BOB TRADER
AERO SUPPLY
929 PENN AVE.
PITTSBURGH 22, PA.

EASY TO LEARN CODE

Learn or increase speed with an Instructograph—the Code Teacher that takes the place of an operator-instructor and enables anyone to master code without further assistance. Available tapes from beginners' alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready—no QRM. Thousands have "acquired the code" with the Instructograph System. Write today for convenient rental and purchase plans.

INSTRUCTOGRAPH COMPANY
4717 Sheridan Road
Chicago 40, Illinois

ATTENTION—X-C PILOTS

Pilot's handy vest pocket X-C NAVIGATION AID is handiest, most inexpensive Aid on market today. Provides complete record of necessary data needed in X-C Flight. Combination Protractor, Mileage Scale, Ground Speed Scale and Flight Log together with space for Compass Courses and Headings. Provides Permanent Record of Trip. Fits pocket.

Packet of 10—$1.00

D. D. DRYNAN
9615 Vanderpoel Ave. Chicago, Ill.

Let's Fly Up to Canada

(*Continued from page 41*)

adequate cooking utensils and mess kits, matches in a waterproof container, pocket compass, three-quarter size axe with a 28-inch handle, four ounces of snare wire.

If the flight is to be made in summer, you will also need mosquito bars or a fly-proof tent, four trawls (trot-lines), two lines and sinkers and one fish net. In winter you'll add sleeping bags and snow shoes. Such requirements are considered minimum. You are expected to make further additions at your own discretion for exceptionally long flights.

Where you fly in Canada depends on what you want to do—and the sort of landing gear on your plane. Float-equipped craft have the advantage. Canada is lavishly strewn with lakes and rivers, from bodies of water hundreds of miles long to those just large enough for a float-plane landing. Many of the larger lakes contain islands, sometimes even thousands in number (as in Georgian Bay and Lake-of-the-Woods) where float-plane pilots can taxi right up to their own little world.

But pilots of wheel-equipped aircraft also will find good landing fields throughout Canada—more today than before the war, since RCAF training required construction of dozens of new ones.

Relatively few of these fields will be privately operated. Most large Canadian cities have an airport which is used by the scheduled airlines as well as private flyers. Many flying club fields already are back in operation after a wartime lapse. But you'll find none of the small airfields as fully-equipped as their U. S. counterparts. All licensed airports, however, are equipped to service aircraft of all types. Remember, your dollar is worth $1.10 at Canadian rates of exchange, and the Imperial gallon of gas is one-fifth larger than the U. S. measure.

Check the listing of these licensed ports again. You'll find they are widely scattered throughout the Dominion. Most of them are located near the border where they can be easily reached by lightplane from nearby U. S. ports. Each one is an ideal base for vacation side-trips.

Routes of the numerous non-scheduled commercial services offer other interesting flight-plan possibilities. These bush freighters carry the personnel and supplies of the gold mining and fur industries and their itinerary includes some of the most colorful spots in the northland.

These are only a few of the almost unlimited possibilities—you can take it from here. Just remember, if the lust for adventure gets in your blood (and Canada is bound to put it there) use your head. Arrange for gasoline and supplies ahead when you are off the beaten path and always keep some responsible person informed as to where you're going and when you expect to return. END

CANADA'S LICENSED AIRPORTS

ALBERTA
- **Edmonton
- Medicine Hat
- **Cooking Lake
- Lethbridge
- Calgary

BRITISH COLUMBIA
- Grand Forks
- Fernie
- Cranbrook
- Vancouver
- Wycliffe
- Princeton
- Terrace
- Smithers
- Kimberley
- Quesnel
- Port Hardy
- Trail
- Penticton
- Hope
- *Sproat Lake
- *Seton Lake
- *Atlin
- *Zeballos
- *Fort St. James

MANITOBA
- Winnipeg
- *Lac du Bonnet
- *Schist Lake
- *Selkirk

NEW BRUNSWICK
- St. John
- **Fredericton

NORTHWEST TERRITORIES
- *Fort Smith
- *Aklavik
- *Cameron Bay

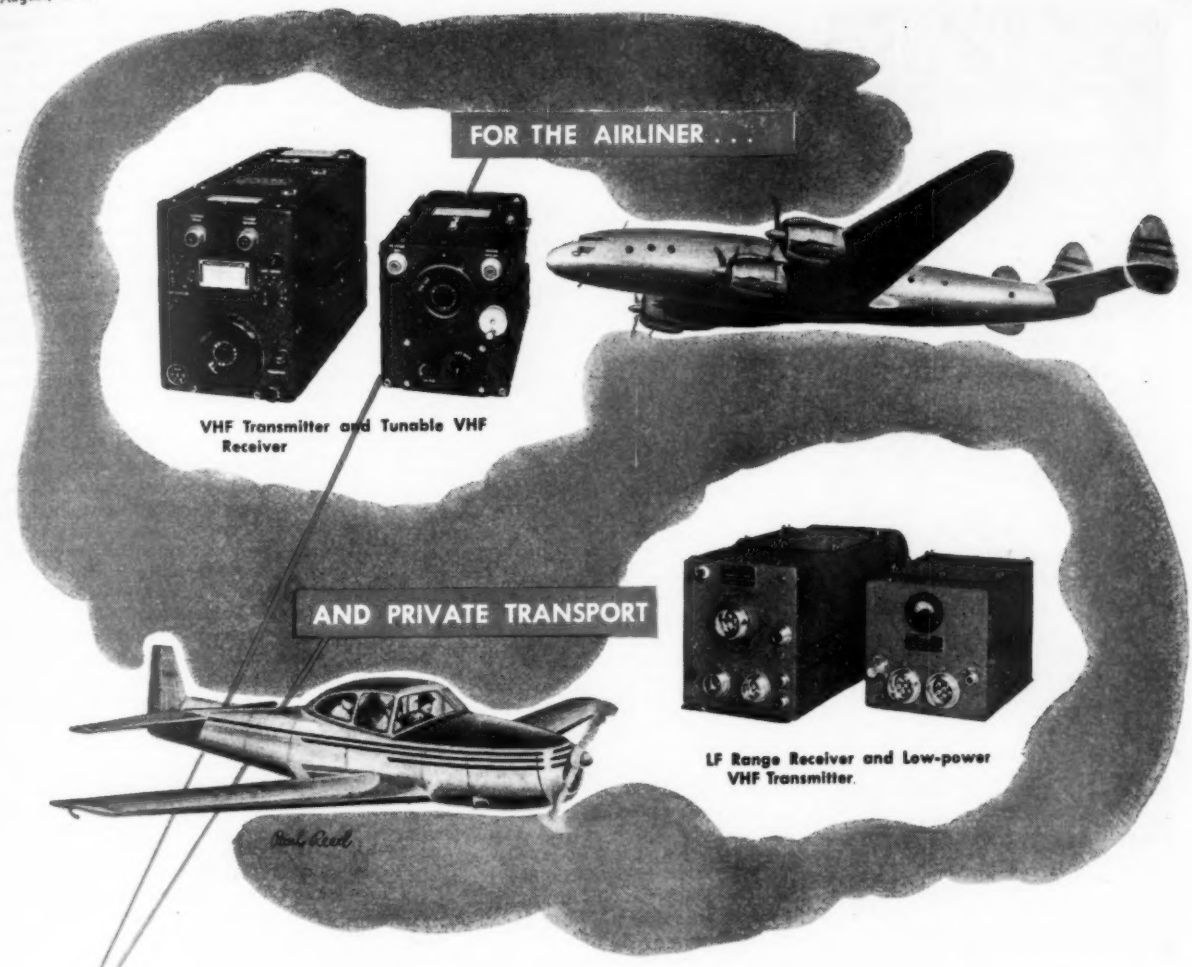
NOVA SCOTIA
- Waterville
- *Millidgeville
- Sydney

ONTARIO
- DeHavilland (Toronto)
- London
- Fort Erie
- Kingston
- St. Catharines
- Malton
- Armstrong
- Kapuskasing
- Fort William
- Ottawa
- Windsor
- Barker
- Toronto Island
- Hamilton
- Kitchener
- Buttonville
- Oshawa
- Brantford
- Welland
- *Orient Bay
- *Remi Lake
- *Sioux Lookout
- *Toronto Harbour
- *Sioux Lookout (OPAS)
- *Sioux Lookout (Oaks)
- *Hudson
- *Red Lake
- *South Porcupine
- *Kenora
- *Pelican Lake
- *Trout Lake
- *Ramsay Lake
- *Huntsville
- *Larder Lake
- *Rainy Lake

QUEBEC
- Rimouski
- **Fairchild (Longueuil)
- **Lac a la Tortue
- Cartierville
- Comeau Bay
- Seven Islands
- **St. Jovite
- *Roberval
- *Vickers (Montreal)
- *Rouyn
- *Lac Plantain
- *St. Felicien
- *Chibougamau Lake
- *Garden Island Lake
- *Oskelaneo Lake
- *Senneterre

SASKATCHEWAN
- Moose Jaw
- Regina
- Saskatoon
- North Battleford
- Weyburn
- *Emma Lake
- *Lake Waskesiu
- *Big River

(*) Indicates seaplane base only
(**) Indicates both seaplane and landplane bases


FOR THE AIRLINER . . .
VHF Transmitter and Tunable VHF Receiver
AND PRIVATE TRANSPORT
LF Range Receiver and Low-power VHF Transmitter

"Systems Engineered" Communication

Based on designs tested and proved under rigorous wartime operating conditions, complete A.R.C. communication and navigation installations will soon be available to the commercial aircraft operator, and to the private pilot who requires the best in his radio equipment.

With the increasing use of electronic devices for the navigation and control of aircraft, A.R.C. has long encouraged the "Systems Engineering" of these devices into the basic design of aircraft. Today A.R.C. offers its 18 years of experience to serve the aviation industry in the design and production of electronic equipment for aircraft.

Operating its own large and small aircraft from its private airport, A.R.C. also makes available full facilities for flight testing units or complete systems of electronic equipment. For information and engineering data, or consultation on a specific communication problem, write:

A.R.C. COMPONENTS

Variable and Adjustable Air Condensers • Miniaturized D.C. Relays • Precision Built Switches • Multi-contact Connectors with Ceramic Inserts • Sealed Condensers, Chokes and Transformers • Snapslide Fasteners and Associated Parts • Microwave Plumbing and Accessories

AIRCRAFT RADIO CORPORATION

BOONTON, NEW JERSEY

12 HOUR
Recorder
The finest high-quality Chronograph for the expert.
• Water-resistant
• Shock-resistant
• 17 Jewels
• Radium Dial
• Stainless Steel

WITH THE BERYLLIUM HEARTBEAT
O. MAIRE, INC.
45 Lispenard St., New York 13

TINY POCKET SIZE
NEW RADIO!
Slips in your pocket or purse. Wt. only 8 ozs.! Complete READY TO PLAY as shown with self contained phone for personal use. Smooth durable black and silver plastic case. Has patented fixed Crystal—Slide Tuning Dial! NO TUBES. BATTERIES, OR ELECTRIC PLUG-IN REQUIRED —Little upkeep cost—Should last for years. USUALLY RECEIVES LOCAL BROADCASTS without outside aerial wires.
GUARANTEED TO WORK when connected and used according to instructions sent with each radio. Can be used in homes, offices, hotels, cabins, in bed after hours, etc.
Send Only $1.00 (Cash, money order, check) and pay postman $2.99 plus delivery fees on arrival or send $3.99 for postpaid delivery. IDEAL GIFT FOR CHILDREN OR ADULTS ALIKE! NEWEST PRACTICAL NOVELTY! Get your PAKETTE RADIO NOW for real enjoyment. Order today—NOW! Dealers in most cities.
PA-KETTE ELECTRIC CORPORATION, Dept. F-8, Kearney, Neb.

NEW IMPROVED PILOT'S FLIGHT LOG

Designed to conform with the latest C. A. R. requirements. High grade hand made Flexible Binding. Attractive dark finish. A Quality Book throughout. Full page imprint to Dealers who order 100 books. Price $1.00—Discount to Dealers. ORDER NOW.
SKYWAY DISTRIBUTORS
3939 N. Pulaski Road Chicago, Illinois

The Magic Mariner

(*Continued from page* 43)

The erection of a ground station is comparatively simple; two men without special skills can put up a whole unit in about three hours. Any plot of ground about 50 x 100 feet serves for a location. But it is best to put the ground station at the highest possible elevation and radio paths must be checked against the possible occurrence of high ground which might act as a barrier to the radio transmission. A high building in the path of the out-reaching radio pulses would disrupt the whole service.

The workings of the ground stations and the airborne stations together hold the secret of Shoran. Stated simply, it is based on echo-timing to determine the distance of the airplane from each ground station. The echo-timing methods measure the time required for a short train of radio waves (called a pulse) to travel over the distance from the airplane to the ground stations and back again.

The transmitter in the airplane sends out a pulse of radio energy and simultaneously it makes a kink or "pip" on the screen of the cathode-ray tube in front of the operator. (This initial pulse is called the *marker pip.*) When the radio echo of this pulse returns it makes another pip on the screen. (The second pip is the *echo pip.*) The distance between pips depends directly on the time required by a radio pulse to make the round-trip over the range being measured. And since the radio pulses travel at a known speed (186,320 miles a second at sea level) this distance between pips indicates the length of the round-trip radio pulse path in miles, tenths, hundredths and thousandths on mileage dials and thus shows the airline distance between the airplane and each ground station.

Although the same principle is elementary in almost all radar systems Shoran has modified it in an important way. The initial outgoing radio pulse is sent out before the marker pip appears on the screen instead of simultaneously with it. The returning signal or echo pip arrives at the airplane just as the marker pip is put on the screen. By adjusting a series of knobs and dials until the marker pip and echo pip coincide on the cathode-ray tube screen, the operator gets a reading of his mileage from the Shoran ground station. The trick is done with a new phase-shifting and pulse-generating system of extreme precision which is calibrated to read directly the distance between the airplane and the ground station. It indicates to the nearest 2/100 of a mile (26 feet) and can very easily be estimated to 1/1000 of a mile or 5.28 feet.

Since pulses from the airplane are sent out in alternate groups or trains, first to one ground station and then to the other, it is possible to obtain a navigational fix and thus determine the exact position of the airplane. The pulses are sent out so fast (about 950 to 1,000 per second) that they provide a continuous fix instead of a series of fixes which is the principle of Loran. The entire "fix" operation can be accomplished in a few seconds.

The radio waves used by Shoran travel in nearly straight lines—like light rays—between each ground station and the airplane. How far out they can reach depends on the heights of the airplane and the height of the ground stations above the prevailing earth level. For example, a range of 285 miles can be obtained with an airplane at an altitude of 35,000 feet and a ground-station elevation of 200 feet. Or, at 12,000 feet, the plane can obtain fixes at a range of 173 miles. With higher altitudes and ground station elevations the range increases. Yet even at very low altitudes the range is ample for short cross-country navigation. Flying at 1,000 feet you can use Shoran within a 55-mile radius and even when hedge-hopping at 500 feet the system is effective at a range of about 42 miles.

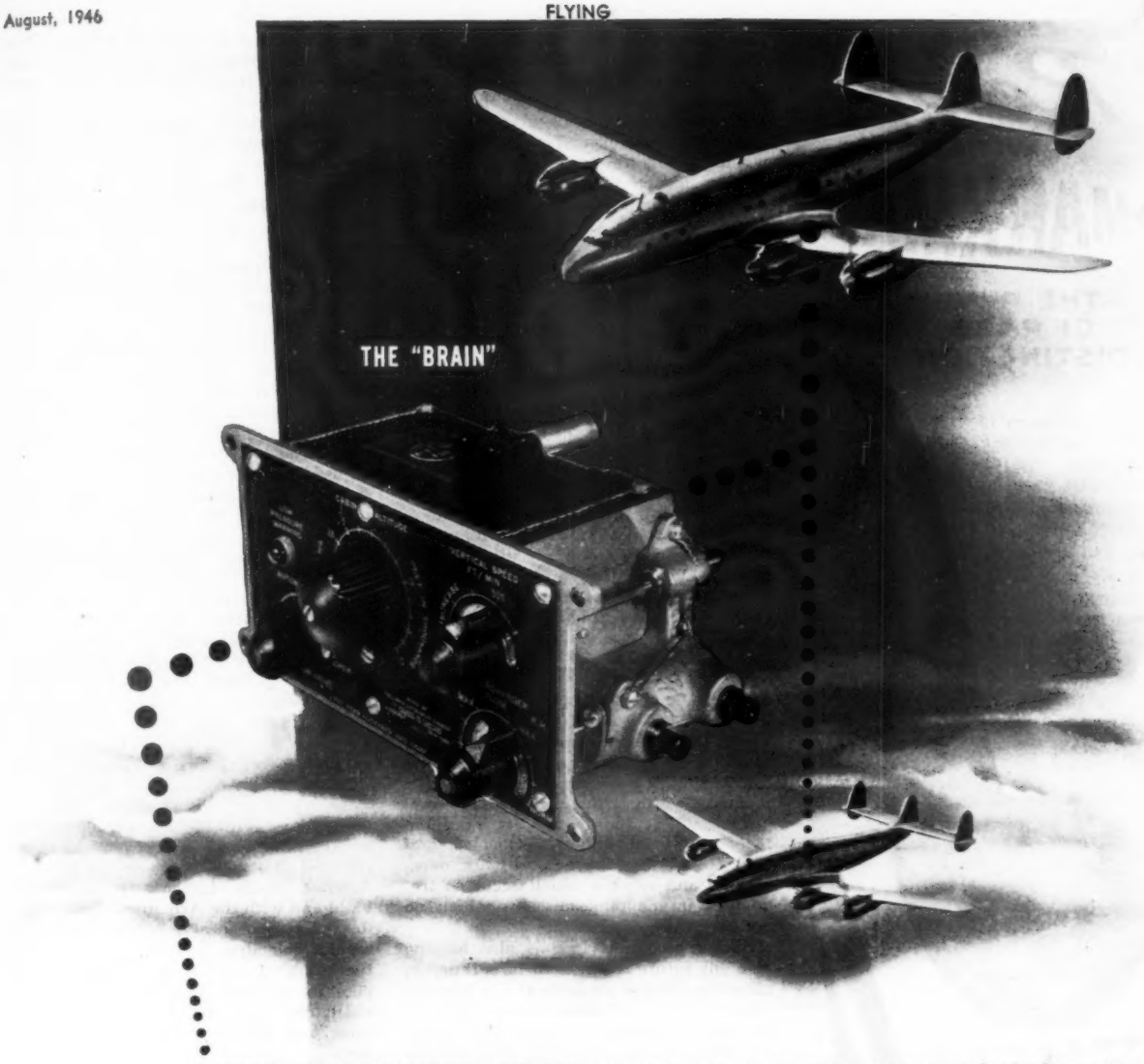
Recently, tests by Wright Field's Armament Laboratory extended the range. A *Fortress* with two Shoran ground stations in its belly and flying in a controlled area between the conventional ground stations and the co-operating airplane virtually becomes a ground station in the sky. And since it flies in a controlled orbit and compensates automatically for distance variations the "position-finding" airplane can locate itself by Shoran even when it is beyond the normal range limit. Tests of this nature have extended the range to about 480 miles and engineers expect to get even greater distances.

Originally intended as a navigation aid, Shoran quickly demonstrated great potentials as an aid to blind bombing. This led to the development of a special bomb computer, the K1A. Using Shoran data it supplies the necessary trajectory, time-of-release, miles-to-target, drift and other information which make possible hits even through heavy overcast conditions. Connected with the automatic pilot it flies the airplane on a "fixed" radius arc (determined by Shoran) and then automatically makes corrections so the plane will fly over the target and release its bombs at exactly the right instant.

Maj. R. L. Dickson of the Bombardment Branch, Armament Laboratory, at Wright Field, who helped develop the computer and also took it into combat for the first time, said that it can put about 90 per cent of all bombs dropped inside a 600 foot circle. "It uses Shoran data just as the Norden bombsight uses optical data," he explains. "It makes bombing a pure knob-turning routine and anyone with normal reflexes can handle it with little training."

Dickson and Capt. R. J. Winn of the Aircraft Radio Laboratory took Shoran to war in a mission against the Findenza railroad bridge across the Po River in Italy on December 10, 1944. Twenty-four Shoran-fitted *Mitchell* bombers of the 310th Bomb Group took part in the raid. They did considerable damage. But on the second mission the bombers knocked out three spans of the Parma-West Bridge in northern Italy. And records show that in its first month of combat alone Shoran-guided *Mitchells* crumpled six bridges in eight attacks.

A system so precise and accurate has great potentialities both for future military and commercial flying. It will play



CABIN PRESSURIZATION CONTROL for high altitude aircraft calls upon a field of experience in which Kollsman has excelled for many years — the measurement and control of minute pressure differentials. Currently, it has developed and is manufacturing to Lockheed specifications the unique control unit used to regulate pressure in the Constellation's "Normalair" cabin. Aptly called the "brain", this unit consists of a highly sensitive interacting assembly of pressure detecting units and actuating mechanisms. It not only maintains cabin pressure at a pre-set figure, but arrives at it in accordance with a pre-determined rate of change. Further, it guards against too great a pressure differential between cabin interior and the atmosphere. Kollsman is also devoting its experience in pressure control and its background in the manufacture of practical precision devices to the development of similar units for other transport manufacturers.

KOLLSMAN AIRCRAFT INSTRUMENTS

PRODUCT OF

SQUARE D COMPANY

ELMHURST, NEW YORK · GLENDALE, CALIFORNIA

Relax
WITH A
»MARXMAN«
THE PIPE OF RARE DISTINCTION

Men of discernment look for the MARXMAN name on the pipes they buy. It spells mellowness, sweetness, rare smoking qualities. It spells pipes made by skilled craftsmen from selected, aged briar roots . . . into distinctive shapes. Mass production methods are avoided. Each pipe is individually cut, rubbed, and polished.

AT FINE STORES

SUPER-BRIAR . . . the briar is selected for its perfection of grain pattern . . . the grain heightened to enamel-like smoothness and brilliance by rubbing and polishing. In your favorite shape. $5

BENCH-MADE...imported, seasoned briar skillfully carved by hand. This style offers men a grand adventure in sweet, cool smoking!

$5 $7.50 $10
Regular Large Massive

FREE
Interesting booklet for pipe smokers. Tells how to break in a pipe... shows how fine pipes are made. Address... Desk 258

»MARXMAN«
29 W. 24TH STREET, NEW YORK 10, N.Y.

an important part in the guided-missile program. It would be possible, for instance, to develop a slightly different type of computer, put it inside a robot bomb, and control the missile along a predetermined trajectory. There is also the possibility of "reversing" the system so that ground controllers would know the exact continuous location of the missile along its path to a target and could, by remote control, make necessary corrections to increase its accuracy.

One officer also outlined a plan whereby Shoran-equipped airplanes would be ideal for air support operations. He said that one method under consideration can be described as "laying an aerial barrage." The planes could, he explained, lay a barrage of aerial bombs along a definite line just as artillery lay down their shells along a pre-determined line ahead of the advancing doughfoots. Setting of the Shoran controls would enable airplane crews to release their bombs at the correct points to insure hits with minute accuracy along any given line of attack. Obviously, by means of a time schedule or radio commands, the position of the target line could be moved forward at will to conform with the progress of the combat situation.

Then, too, Shoran is in great demand by aerial survey agencies. For the first time it enables an aerial photographer to know his exact position in the sky every time the camera clicks off a picture. That can help cartographers to locate ground points to within a few feet of their exact position. Too, Shoran permits the photo planes to fly an almost perfect straight line, eliminating the necessity for overlapping and retakes which occur so frequently in mapping missions which do not make use of Shoran.

Shoran-reconnaissance is also helping plan any future robomb warfare. It makes target-spotting so accurate that it literally puts targets on a checkerboard in front of the attack-planners detailing the enemy positions. It enables them to know the precise location of target objectives. When this information is fed into the robomb computers, direct hits are made with amazing regularity.

Unfortunately, though, the experts don't see much of an immediate future for Shoran as a navigational aid for the private flyer. The sets today cost upwards of $5,000. However, it is admitted that cheaper sets could be made to meet any demand.

Such equipment probably would use a radar altimeter instead of conventional Shoran airborne equipment to integrate ground stations to an accuracy within about 100 feet. In a sense this is the same thing as a Shoran transmitter which receives retransmitted pulses from ground stations rather than having them reflected off ground objectives as in the ordinary radar altimeter operation. It would be used, however, to trigger pulses out to two ground stations and obtain "fixes" the same as in the operation of Shoran. A set of this nature would cost between $200 and $300 and weigh between 40 and 50 pounds. It would permit a personal plane pilot to navigate with dead-reckoning or any other means until he was within 40 to 50 miles of a "closed-in" field. Then it would enable him to locate his exact position and come in safely. They have designated the idea "Short Range Shoran."

Shoran was first thought of as far back as 1936-37 by Stuart W. Seeley of the RCA laboratories but the basic ideas were crude and didn't excite much interest either with the commercial airlines or the military. The war, however, changed that and RCA worked with the Aircraft Radio Laboratory at Wright Field and with the Armament Laboratory to perfect Shoran as a bombing aid. The results you already know and now that the cloak of secrecy is off Shoran can take its rightful place among the electronic wonders of the war. Its peacetime role promises even greater wonders. END

GOING SOMEWHERE!

Now . . . you and your family can take real vacations . . . together. Vacations you've dreamed about can be yours with this sturdy four-place all-metal amphibian. ¶ Here's the ideal travel vehicle for the business man and his family. The busier you are, the more precious are the undemanding hours of sheer relaxation . . . so whether your choice of time out is a weekend with the family, a quick trip to the fishing streams or a round of golf at some distant course you've hoped to play for years, the SEABEE will take you there and back quickly . . . in comfort. ¶ Spend more time on the job, have more time for play . . . you make your own schedules when you go the SEABEE way . . . $3995. F.A.F. Farmingdale.

Your copy of "Landings Unlimited" sent free. It stresses modest operating cost and performance specifications. Address Blue Ribbon SEABEE Dealer nearest you, or write the Personal Plane Division, Department 19C, Republic Aviation Corporation, Farmingdale, Long Island, New York . . . . .

Seabee

A PRODUCT OF REPUBLIC AVIATION

Makers of the Mighty Thunderbolt

MURDOCK HEADPHONES

FOR safety in flying you'll want your plane equipped with a dependable radio complete with MURDOCK Headphones.

On routine flights or emergency landings, MURDOCK time-tested Headphones will "hear you through!" You'll receive signals, weather reports, instructions clearly and accurately . . . the first time . . . all the time! MURDOCK Phones keep out engine noise—help you listen without strain.

Whatever ship you fly—private single-seater or giant cargo transport—you'll fly with greater confidence with MURDOCK Headphones guiding your flight.

Write for Full Information Today.

WM. J. MURDOCK CO.
207 Carter St., Chelsea 50, Mass.

Why the Jap Air Force Failed

(*Continued from page* 45)

ment and facilities. Anyone trespassing the dividing line was subject to immediate arrest.

5. The *Kempei-tai* (Japanese army secret police) arrested hundreds of navy men actually caught sabotaging army aircraft and ground equipment.

6. Army flyers disliked over-water missions because if they had to ditch the navy usually refused to rescue them.

Capt. Ijn Genda, an attache at the Imperial Navy Headquarters, told American intelligence officers that "the whole Japanese air organization was split into three separate divisions—the army, the navy, and what was known as the government. The only one who could co-ordinate the three was the emperor.

"Had there been someone between the emperor and the two branches of service," Genda asserted, "things would have gone much better. As it was, each branch tried to carry out operations of its own. We never could convince the army of the importance of control of the seas."

Genda also disclosed that in the desperate campaign to save Okinawa 920 planes were expended, 673 from Kyushu and 250 from the island of Formosa. He denied that women were ever used as pilots and, when told that one Jap flyer had been found with his feet lashed to the rudder pedals, he seemed certain that the flyer had done it on his own initiative. He was equally certain that a majority of the pilots (most of whom had less than 100 hours flying experience) were thoroughly imbued with the fanatical zeal necessary to the completion of such a suicidal mission. And he estimated that more than 40 per cent of the *kamikaze* attacks were successful.

But the resort to suicide tactics only served to reveal to the public in general that the Japanese war team had failed to provide its men with effective tactical weapons and techniques. The nation's morale slumped immediately. Now we know that this collapse was really a matter of slow rot—a condition that existed before the outset of the war.

Reports made to Fifth Air Force investigators indicate that at the time of Pearl Harbor the Japanese had only 1,570 combat aircraft. By mid-1943, there were 2,640 planes in fighting condition, and by July, 1944, production was averaging 1,000 aircraft per month. Superficially, things looked good for the Jap.

Yet, at the close of the war, the Japs did not have a single jet-propelled aircraft. In a spite-fraught race to outdo each other in construction of conventional combat craft, both services had depended on the Germans for design innovations. The Germans, who had promised so much, had supplied blueprints for only one rocket ship, designated the KI-200 and patterned after the ME-163. It was completed in July, 1945, but crashed from 20,000 feet. Ten planes were to have been ready for combat in August, when the surrender came but there is no record of German technicians having ever been assigned to Japanese factories.

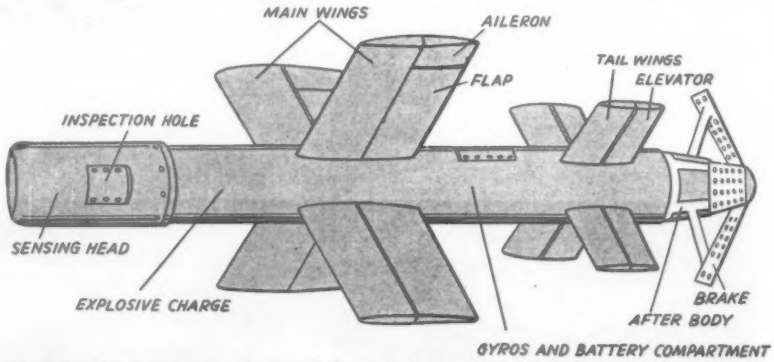
Even construction of conventional types was impeded by the Jap attitude.

The navy had a complete design for a six-engined bomber, called the *Fugaku*, which would have weighed 220,000 pounds and was to carry a crew of seven. A 42,600-foot service altitude was contemplated. But the *Fugaku*, because of bickering over limited materials, never got beyond the model stage.

Another plane with which the Japanese were experimenting was the *Shinden* (J7W1), an experimental pusher-type fighter resembling the U. S. Army's Curtiss *Ascender*. The *Shinden* was built around an 18-cylinder, air-cooled, twin-row engine which supplied 2,100 h.p. at take-off. The plane had a six-bladed prop, a service ceiling of 39,400 feet and a rated speed of 400 m.p.h.

But the *Shinden* suffered from propeller-blade flutter and the Japanese still were arguing among themselves as to who could produce a special hollow steel prop of the Curtiss type when surrender came.

This chronic jealousy kept many excellently-designed planes from reaching production until it was too late. When the occupation forces moved into Japan they found four experimental models of a two-engined fighter having the same general configuration as the U. S. Navy's Grumman *Tigercat*. The Japs called it the KI-108 and said it could do 500 m.p.h. at 9,000 feet. One of the planes, found at Maebashi, was flown to the Yokosuka naval base for shipment to the U. S. On the trip, the plane easily outdistanced a



Heat-homing bomb was only one of the many last-stand devices which cost the Japanese valuable construction time. It was designed to home on smokestack heat from enemy ships.

'DOC' ATOR CHOOSES AIRADIO

Crack American Airlines Captain Uses *AIRADIO* Super '52' In His Personal Plane

'Doc' Ator is an old hand at piloting the great Flagships of American Airlines. In fact, 'Doc' loves flying so much that when he's through with his regular runs, he steps into his personal plane and takes off for a fishing trip.

'Doc' Ator's Opinion

"Being an airline pilot," 'Doc' Ator told us the other day, "I know that every plane should have a two-way radio. Personally, I have an Airadio Super '52' in my own plane.

"I was looking at an Airadio ad that had the phrase, 'more power per radio ounce.' Brother, they aren't kidding! It always sort of surprises me when I hear how much volume can come out of such a small set. The Super '52' is a swell outfit."

Other Important Features

Thank you, Captain Ator. And remember... besides all the features 'Doc' Ator has talked about, Airadio also gives you easy-installation, standard-size components replaceable anywhere, long-range reception and transmission, *plus* the assurance of uncompromising quality built-in by Airadio's pilot-engineers.

'DOC' ATOR SAYS:

"Airadio is the only set I've seen that makes me feel as safe in my small ship as I do in a Flagship. Also, it's a lot more fun when you have company on a flight and can tune in your favorite radio program."

WRITE TODAY FOR PARTICULARS ABOUT THE "WORLD'S MOST MODERN AIRCRAFT RADIO"

Receiver, weight 3 lbs. 4 ozs.

AIRADIO
INCORPORATED · STAMFORD, CONNECTICUT

PRODUCTS OF RESEARCH... SKILL... EXPERIENCE

DISTRIBUTED BY AIR ASSOCIATES, INC., TETERBORO, N. J.
Branches: ATLANTA • CHICAGO • DALLAS • KANSAS CITY • LOS ANGELES

Grumman *Hellcat* escort assigned to it.

According to available information—although many records were destroyed prior to our arrival—the Japs also built and flew a pilotless aircraft, the *Igo*. But there were only two models, A and B, of the highwing monoplane. *Igo-A* was built by Mitsubishi in 1944 and carried a 1,750-pound warhead in the nose. *Igo-B* was built by the Kawasaki Aircraft Company and carried a 660-pound warhead.

Igo was flown to within 6½ miles of the target by a mother plane. *Lily*, an army medium bomber, was usually the mother plane for *Igo-A*, and *Peggy* was the parent plane for *Igo-B*. Only a few of them were used—again the reason was lack of co-operative production methods.

The Japs also had high hopes for the *Rob* which looked like a *Warhawk* except that its nose was longer and it had a counter-rotating six-bladed propeller. The plane was built around two HA-40, inverted-V, watercooled engines, placed one behind the other and geared to a single propeller shaft.

The engines of *Rob* were cooled by circulating steam vapor that moved from the engines to wing-surface coolers in the outer panels. With this plane the Japs hoped to attain level flight speeds of 450 miles at 16,400 feet. The craft had 302 square feet of main wing area and could reach 16,000 feet in five minutes. It had two 13-mm. fixed guns and two of 20-mm.

But only one model was completed and it crashed after five flights. The airframe was repaired but no new engines had been provided with which to continue the testing.

The navy had a new fighter, called *Ressu*, and a reconnaissance plane, known as the *Keiun*, under experimentation. There also was a bomber known as the *Rendan*. Four *Rendans* were built but production stopped when serious flaws developed in the exhaust turbine and it was impossible to get metal of higher heat resistance. The navy also had been talking about two gas-turbine *baka* planes, one model of which could take off from the ground under its own power.

After the U. S. Army Air Forces started putting 75-mm. cannon in its *Mitchells*, the Jap navy began similar experiments. After some testing, during which several planes fell apart in mid-air, it was decided to use a 60-mm. gun in the bow of the *Ginga* (*Frances*) and to use the plane as an offensive fighter against large bombers. But effectiveness of all new gun installations was reduced by the fact that both services insisted on using different caliber weapons.

And so went the story of inter-service competition. Excellent plans were made but somehow they never seemed to materialize or they were compromised. The time lag between conception and production of aircraft was estimated at two years. By cutting corners and accepting designs which were chiefly modifications of former aircraft, old jigs and various other machines could be used with only slight changes.

All this contributed materially to the success of every American bombing raid. With Jap aircraft engine production always lagging behind its safe ratio as to airframe output, our bombing attacks on engine plants were doubly effective. Approximately two-thirds of all engines produced were ruined or lost before reaching combat. Poor maintenance and installation, plus normal ferrying losses, were among the factors.

Production of aircraft components was a poorly organized hodge-podge. It is estimated that 20 or 30 per cent of engine components and 50 to 60 per cent of airplane parts were obtained on sub-contracts. Many of the sub-contractors were small neighborhood factories which in turn contracted with individual households. Today, broken and rusted drillpresses stand in the ruins of thousands of Tokyo homes which the *Superfortresses* blasted.

As a last resort, the Japanese turned to razzle-dazzle in the effort to defend their "sacred soil." They spent valuable time, for instance, developing a heat-homing bomb called the *Kego*. It was designed to dive down warship stacks before exploding. Its effective range was estimated at six miles. Production was about to begin when a fire raid ruined the factory.

Another projected device was an anti-personnel bomb which would, it was hoped, seek out and chase a man for 350 feet before exploding against his body.

It was only a short time before Hirohito decided to call it quits that the moving of aircraft factories to underground sites got under way. Near the city of Hachieji, Nakajima was boring 12 tunnels, six of them 500 yards long and the others 350 yards in length. And at the technical arsenal in Yokosuka, where operations resembled those at the Philadelphia Naval Air Material Center, more than 20,000 persons were employed in 10 miles of tunnels. Approximately 80 per cent of the machine shops and 50 per cent of *baka* sheetmetal work went belatedly underground in the summer of 1945.

There is a wealth of data to indicate that superior American air power was solely responsible for the Japanese downfall.

Gen. Masakazu Kawabe, commanding general of the Japanese Army Air Force, says "that our losses in the sky cost us the war."

Rear Adm. Toshitane Takata, deputy chief of military affairs in the Navy Ministry, reports that "of the three sources—air, sea and land—air by a wide margin contributed most to the defeat."

Lieut. Gen. Saburo Endo, chief of the ministry of munitions aircraft, asserted: "The cutting of supply lines, the bottling of Japanese shipping, and destruction of industry from the air so reduced the Japanese capacity to wage war that we were ready to sue for peace before the atomic bomb was dropped."

But added to all these more obvious reasons for the Jap defeat are the little things. Things like the fact that though Jap pilots had oxygen, parachutes, flak suits, life rafts and other survival equipment, little attempt was made to train airmen in the proper use of the devices. Pilots were under standing orders to stay with their planes. They were to ditch airplanes rather than bail out, yet no special instruction regarding ditching was provided. Navy fighters were equipped with shoulder harnesses but many pilots failed to use them—and no studies were made to determine what effect this had on casualties in ditchings and forced landings. Nowhere, even in little things like these, was there any real evidence of teamwork.

Today the smoke still rises from the 233 airfields in Japan as American occupation forces put the final torch to the wreckage of what once gave promise of being an invincible striking force. And the very ashes testify the effects of inner dissension. END

The Feminine Flourish
or the MASCULINE MAUL

No matter whose hand pilots a *Navigator Pencil* you'll find it giving yeoman service right down to the very end.

Uniform degree of texture — grading — quality — plus the results of years of experience in pencil manufacture, make the *Navigator* the "handy" pencil for men and women.

Send for Leaflet No. 17

KOH-I-NOOR PENCIL COMPANY, INC.

BLOOMSBURY, NEW JERSEY

Just the size of a Snapshot

The instrument panel cut out for the Lear PXer runs 4" x 5" — just a popular size of photograph. And it's only 8" deep. So the whole unit's smaller than the average glove compartment.

Yet in that space — and with weight measured in ounces — you get a dependable transmitter-receiver that gives you contact with the fields, lets you ride the beam, keeps you posted on the weather, and adds confidence to your cross-country flying.

Back of the PXer is Lear's 16 years of experience building aircraft radios. From Alaska to South America they've proved themselves. And wherever you fly there's a specialist nearby to provide complete service.

Check list of Features of the LEAR TR-2B PXer

- ★ Weighs only ten pounds complete — transmitter — receiver — power supply — mike and phones
- ★ Low price
- ★ Range filter
- ★ Provision for direction finder
- ★ Dependable
- ★ Highly sensitive and selective

For Your Personal Plane You'll Want

LEAR RADIO *The Name Men Fly By*

LEAR, Incorporated, Aviation Radio Sales • 110 Ionia Avenue, N. W. • Grand Rapids 2, Michigan

Something New on the nose of the New CULVER

CULVER'S first post-war presentation, the Culver "V" joins the long and impressive list of planes equipped with Sensenich propellers. Right on its nose is the new Skyblade, the lightweight, two position, controllable pitch *propeller with performance* that adds "pull" to every horsepower. Culver is first to specify the Skyblade as standard equipment. Other models — both controllable and ground adjustable are approved for other aircraft.

Propeller repair service (all makes) available at Sensenich's PROP-SHOP.

Standard of Performance

SENSENICH Skyblade Trade Mark

SENSENICH BROTHERS

LANCASTER, PA. GLENDALE, CALIF.

This makes it SHOCKPROOF
SELF-WINDING —
Tourneau's "never-have-to-wind" waterproof, shockproof, antimagnetic watch, designed for dependability
In steel 57.75*
*Federal Tax Incl.

TOURNEAU Watches

431 MADISON AVENUE, AT 49th STREET N. Y.

Report from Washington

(*Continued from page* 46)

incensed at the legislature's refusal to grant a gas tax rebate, four cities refused to "sacrifice" their "large investments" in municipal airports. Independent operators fumed about "competition with private enterprise."

Martin's plans had been made well in advance. As early as December of last year he had outlined to the state budget commission the 37 airports he intends to use as main cogs in the state-controlled system. His report indicated that plans already were completed for seven additional airports and surveys completed for 13 others. Nearly 50 other sites were under investigation.

Sales talk of the commission since that time has harped on the need for airports not only where air traffic and populations are heavy but also where safety and special service factors are involved. Highway-airport analogy has been effective in winning much of the commission's legislative support. Representatives from the smaller counties have been led to believe that only under such a system can their districts compete with the big counties in obtaining suitable airports. For the time, Martin has proved that two birds in the bush manage to beat one in the hand.

Memorials

Two small towns have become centers of war memorial work honoring the flying personnel that helped win the big show. One is Althus, Okla., where the War Assets Administration has assembled "name" planes which may have appeal as war memorials. Since we wrote about this before, some 150 planes have been bought for commemorative purposes. Any state, city or local government may purchase the planes at nominal cost. Choice names still on the WAA price list as this goes to press include "Cow Town Kathy," "Frisco Trudy," "Spirit of Notre Dame," "Texas Tornado," and "Windy City Belle." . . . The other town is Poplar, Wis., where a constructive post-war aviation education program has been set up as a memorial to the American ace of aces, Richard I. Bong. Poplar was his birthplace and his memorial is an annual award of 50 aeronautical engineering scholarships to the nation's best high school graduates. The Bong Memorial Foundation also plans to construct a museum for air war relics in the ace's home town. Honorary national chairman of the foundation is Eddie Rickenbacker, with "Hap" Arnold and Jimmy Stewart, Hollywood's up-from-the-ranks ace, as honorary vice-chairmen. Active head of fund-raising is a Poplar businessman, Norman LaPole. The foundation is non-profit-making; winners will be chosen from every state in the union, the District of Columbia, and Alaska.

Flat Hats

One of the most forceful and convincing arguments against flat hats—show-off pilots who stunt into accidents—has come to us from that fountainhead of safety information, Jesse W. Lankford, chief of the accident analysis division of the Civil Aeronautics Board Safety Division. The analysis in question was made by one of Jesse's colleagues, H. G. Crowley, of the CAB safety bureau. . . . Says Mr. Crowley: "One hundred and seven lives, 97 injuries ranging from black eyes to amputations, 121 airplanes washed out and 52 variously damaged, numerous telephone and power lines knocked down with communities silenced and blacked out, and buildings and cars damaged—this is the headline picture of wanton recklessness in civilian private flying covering 173 accidents during the year ended this June. Diving at people or houses, and tree-top acrobatics in general, are by far the outstanding types—87 per cent—of flying included in the category of the above 173 cases. . . . Estimated cost in dollars runs more than a quarter of a million and this does not include hospital bills, funerals, broken careers, and life-time incapacitations. And how about increased insurance rates and a rising antipathy against all flyers by those citizens who suffer from reckless pilots? . . . Exhibitionism is behind 75 per cent of the crazy flying—it is significant that many accidents occurred while friends or kin watched. An audience is as essential to the cowboy pilot as to an actor."

Blackball for Screwballs

Self-discipline is recommended by Mr. Crowley as the solution of the problem—plus severe penalties for stunting. "In the armed services," he points out, "the show-off is quickly and sharply reprimanded, heaved out, or jailed. Private operators may dislike comparable drastic action and continue to tolerate dangerous pilots for economic reasons, fearing that the individual's business will go to a competitor. But if all the operators in a community stick together and blackball the screwball who gets out of line at any field, a partial cure would be effected. Many groups of progressive operators are doing this for their mutual protection, good names, better business, and freedom from law suits and grief. . . . This air recklessness must be stopped. And, with the growing concern of Federal and state agencies—and the example of safe and conscientious airmen, it will be. Crazy pilots don't seem to understand that their actions bring on them derision, not applause, and that they are aviation's worst enemy. They must be made to realize that the laws of safety can be taken no more lightly than the law of gravity. An act of premeditated diving or zooming, endangering persons and property, may be likened to manslaughter and certainly to an attempt at suicide. Those who indulge in it are asking for—and will get—a finely-fitted aeronautical dunce-cap and, so adorned with the stigma of their stupidity, are likely to wind up, not in the corner, but in jail, hospital or morgue."

Buzz Warning

If you think that you can buzz the girl-friend's house and get your knuckles rapped by the CAA only—beware! No

No Problem in Choosing Fabrics

Just look at the record — each year more manufacturers buy more FLIGHTEX than any other airplane fabric.

World's Premier Airplane Fabric FLIGHTEX FABRIC

FLIGHTEX

FLIGHTEX FABRICS, INC. • 93 Worth Street, New York 13, N. Y.

Leading Manufacturers of Fabric and Tapes for the Aircraft Industry

Export Representative—Aviquipo, Inc. 25 Beaver St., N. Y. Cable Address—"Aviquipo"

RESALE DISTRIBUTORS

AERONAUTICAL TRADING CO., Jamaica, N. Y. • AIR TRANSPORT EQUIPMENT, INC., Mineola, N. Y. • AVIATION SUPPLY CORP., Hapeville, Ga., Orlando, Fla., Charlotte, N. C., Nashville, Tenn. • BOB TRADER-AERO SUPPLY, Pittsburgh, Pa. BUFFALO AERONAUTICAL CORP., Buffalo, N. Y. • GENERAL AIRCRAFT SUPPLY CORP., Detroit, Mich. • GENERAL AIRMOTIVE CORP., Cleveland, Ohio • HOOVEN CO., Washington, D. C. • INTER CITY AVIATION, INC., East Boston, Mass. • KARL ORT, York, Pa. • LEAVENS BROS. AIR SERVICE LTD., Toronto, Canada • MARSH & FRANKLIN, Phoenix, Ariz. • W. B. MATTHEWS CO., Aircraft Div., San Antonio, Tex. • MUNCIE AVIATION CORP., Muncie, Ind. • PACIFIC AIRMOTIVE, Burbank, Cal., Oakland, Cal. • PIEDMONT AVIATION, INC., Winston-Salem, N. C. • SNYDER AIRCRAFT CORP., Chicago, Ill., Columbus, Ohio, Denver, Colo., Omaha, Neb. • SOUTHWEST AIRMOTIVE CO., Dallas, Texas • SUPPLY DIVISION, Inc., Robertson, Mo., Memphis, Tenn. • THE AIRCRAFT STEEL & SUPPLY CO., Wichita & Kansas City, Kansas • VAN DUSEN AIRCRAFT SUPPLIES, Minneapolis, Minn.

"AOPA is a swell organization"

W. R. DEVENISH,
AOPA Member Pilot 10605

Pilot Devenish is only one of thousands of AOPA members who have found their AOPA membership a constant source of value and satisfaction. He says, *"Since I am now starting on my third year of membership in AOPA, I thought it was high time to send you a word of appreciation. I read with much interest the letters on your recent survey of the factories and the postwar lightplane situation. It helped to confirm my opinion of the way things are likely to be for the next year or two . . . AOPA is a swell organization and you can count on me for continued support."*

If you own or fly a plane why not find out for yourself how this great non-profit organization of your brother pilots can make personal flying safer, less expensive and more enjoyable.

Many actual services are free, but your greatest benefit lies in allying yourself with the organization whose primary purpose is guarding and advancing the interests of non-scheduled flyers and owners.

Write for full particulars, or use the convenient AOPA membership application form below. If you have soloed you are eligible for membership; dues are only $5.00 annually.

All these Services are Free to AOPA Members

The Washington staff of AOPA will help you in personal flying problems, licenses, regulations, legal tangles, plane sales and purchases, documents, employment. You are also entitled to national AOPA-Hertz Drive-Ur-Self courtesy card with special rates: AOPA Washington Newsletter; AOPA edition of FLYING magazine; TWA-AOPA courtesy card assuring service and maintenance facilities at most TWA airports; distinctive AOPA pilot's wings, emblems for your plane and car, and membership card.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION
National Headquarters, Dept. F-846
Room 802, 1319 F Street NW,
Washington 4, D. C.

I first soloed an airplane at ....In the year.....
I hereby apply for membership in AOPA.
Enclosed find check or money order for $5.00.

NAME.....
Please Print

ADDRESS.....

CITY & STATE.....

PILOT LICENSE NUMBER. .....

SIGNATURE.....
$1.80 of each year's dues are for my subscription to FLYING

"AOPA"

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

NATIONAL HEADQUARTERS ROOM 802, 1319 F STREET NW, WASHINGTON 4, D. C.

WHAT WILL WACO BUILD?

WACO has had a little tougher job of converting to civilian plane production than most plane designers and manufacturers. You see, WACO accepted the task of designing all U. S. Army cargo and transport gliders used during the war . . . WACO built thousands . . . helped other plants build thousands more.

For the first time since 1922—the year when WACO joined the ranks of pioneers in commercial aviation—plane designing and manufacturing at WACO came to a temporary halt.

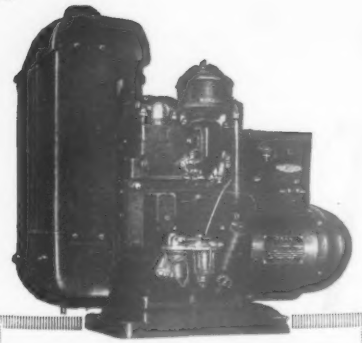
But this short lapse has been more of a boon than a handicap. We've had time to design, from scratch, the kind of plane dictated by the most advanced thinking in aeronautical design . . . a plane we believe will become the aristocrat of privately-owned planes—for business or pleasure. Soon—and we mean *soon*—you'll hear of the *new* WACO . . . designed and built in the WACO tradition . . . of *better* planes for *better* flying!

THE WACO AIRCRAFT COMPANY,
48 Peters Avenue, Troy, Ohio, U. S. A.

SINCE 1922 • *BETTER* PLANES FOR *BETTER* FLYING

WACO AIRPLANES

Waco



ELECTRICITY

To Meet Aviation and Aircraft Industry Power Needs

ONAN ELECTRIC GENERATING PLANTS provide power for many applications in the aviation industry. Available in many models including airborne, lightweight, compact types. Powered by Onan, 4-cycle gasoline engines, they are of compact, single-unit design. For heavy duty service, stationary or mobile.

Onan Electric Plants are available in sizes from 350 to 35,000 watts.

ALTERNATING CURRENT: 115 and 230 Volts, 50 and 60 cycle. Single-phase for all capacities. 3-phase for models 3KW or larger. Other voltages and frequencies available.

DIRECT CURRENT: 115 and 230 Volts, 600 to 10,000 Watts. 6, 12 and 32-Volt Battery Charging types to 3500 Watts. WRITE FOR INFORMATION OR ENGINEERING ASSISTANCE.

Model shown is from W2C Series.

Onan ELECTRIC PLANTS

D. W. ONAN & SONS.
3505 Royalston Ave.
Minneapolis 5, Minn.

RIDE A HARLEY-DAVIDSON

The present tremendous demand for Harley-Davidsons confirms motorcycling as the "world's greatest sport!" And its popularity is hitting new peaks! Enthusiastic motorcycling "fans" are buying Harley-Davidsons faster than we can ship them to our dealers. We're doing our best to keep up with the demand. But we urge you to see your Harley-Davidson dealer EARLY, if you want the adventure—the fun and thrills—that come with owning a Harley-Davidson! Newest models pack so much power, speed and stamina they're well worth waiting for until your dealer can deliver YOUR Harley-Davidson!

Send for Enthusiast Magazine and literature.

HARLEY-DAVIDSON MOTOR COMPANY
Department F Milwaukee 1, Wisconsin

HARLEY-DAVIDSON MOTORCYCLES

less a body than the U. S. Supreme Court is against such activities and will back up anyone filing a case against you with an award of damages. . . . That is the essence of a 5-to-1 decision recently handed down by the Court, which made aviation legal history by ruling that a "land owner owns at least as much of the space above the ground as he can occupy or use in connection with the land." The decision came after a damage suit was filed by Mr. and Mrs. Thomas Lee Causby, who claimed that their chicken business was ruined by low flying Army planes near the Greensboro-High Point, N. C., airfield. "As many as six to 10 of their chickens were killed in one day by flying into the walls from fright," Supreme Court Justice Douglas declared in writing the majority opinion. "The total chickens lost in this manner was about 150. Production also fell off." . . . And incidentally, this is no joke, son. Airlines officials regard the decision with real alarm and point to the dissenting opinion of Justice Black and Justice Burton as indicating the importance of the ruling. It is inconceivable to them, the justices said, that the Constitution guarantees that air space, needed for navigation, "is owned by the particular persons who happen to own the land beneath to the same degree as they own the surface below." A test case to reverse the decision may be expected.

AAF Research

We were still blinking at the display of the nation's aeronautical research talents at Wright Field when we read the announcement of Maj. Gen. Curtis E. LeMay, deputy chief of air staff for research and development, proposing a super-research air base which, if ever completed, will out-strip all the seven wonders of the world put together and make Wright look like a kid's playground. . . . General LeMay proposes that this future Air Engineering Development Center be a permanent peace-time fixture so that fundamental research in aeronautics may never again be interrupted and adequate development facilities will be provided where specific problems connected with the design and construction of aircraft and missiles can be solved. . . . Research in supersonic aircraft, nuclear energy application for powering aircraft and missiles, flight and survival equipment, and operating techniques are among the fields which AAF puts high on the list. . . . The proposed center has Buck Rogers dimensions—"a main location encompassing 100 square miles and additional auxiliary fields and ranges . . . large blocks of economical electric power in the range of 1,000,000 horsepower . . . continuously available . . . quantities of the coldest water . . . for an estimated capacity of 250,000 gallons per minute." Where all this is going to be AAF doesn't know. Only thing they can be sure of is that it will not be at Wright Field—not enough supplies, not enough room.

Briefings

Teen-agers think that commercial airliners are safer than automobiles and most of their parents say it's okay for them to fly, according to a recent United Air Lines survey. Eighty per cent of the kids interviewed hoped to travel by air in the future and 15 per cent have already flown in an airliner, the survey showed.

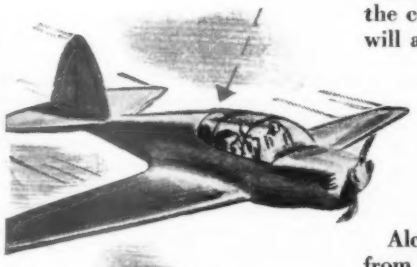
Navy is simplifying its model designations, as witness the new *Skyraider* dive bomber. Formerly known as the BT2D-1 (bomber, torpedo, Douglas) it's now the AD-1 (attack, Douglas). It's quite a plane, too—so good, in fact, that the National Advisory Committee for Aeronautics has chosen its performance characteristics as a standard. END

HERE'S A $100 HANGAR

AN AIRPORT hangar for $100—nothing fancy but definitely better than staking it out in these days of factory hangar shortages, has been built by W. R. Price of Assumption, Ill. The hangar is built of unfinished lumber, has no fancy roof trusses or large sliding doors. The roof is supported by two cables strung from telephone poles and the doors are just large enough to admit an airplane. The end walls of the front are stationary and only the top halves are hinged sectionally to fold down.

Your reasons for buying . . .

an all-metal Alcoa Aluminum plane



Greater Safety, because highest strength is obtained when Alcoa Aluminum Alloys are employed in internal structure and skin. Your personal plane will have this built-in safety.

Low Upkeep Cost, because Alcoa Aluminum is so durable, it resists the corrosive atmospheres of all climates. Easy to keep clean—your plane will always have that sleek, swift appearance.

More Trouble-free Flying Hours, because Alcoa Aluminum stays strong and airworthy. The skin won't puncture from flying stones on off-concrete landings.

Higher Resale Value, because aluminum doesn't get that weather-beaten, frayed-edge look. You'll make a better trade for that new, bigger or faster plane.

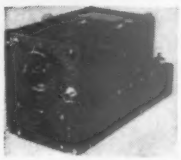
Alcoa engineers have worked hand in glove with the men of aviation from the very beginning. The Alcoa Aluminum Alloys found in your personal planes today have behind them more experience than can be found anywhere else.

So, when you buy that personal plane, remember, if it's all-metal, it's safer. If it's Alcoa Aluminum, it's best! ALUMINUM COMPANY OF AMERICA, 1815 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

DON'T FLY
Deaf or Dumb
FLY WITH ARC-5



NEW ARC—5 Superhet receivers. TUBES: (included) 5—12SK7; 1—12K8; 1—12SR7; 1—12A6. RANGE: (Specify frequency desired) 190-550KC; 1500-3000KC; 3-6MC; 6-9.1MC. PWR: 24-28 volts DC. REMOTE CONTROL unit and DYNAMOTOR. **$79.50**

NEW ARC—5 Transmitters: 25 watts CW; 15 watts phone. TUBES: (included) 2—1625; 1—1626; 1—1629; 1—6200Kc xtal. RANGE: (specify frequency desired) .5-.8mc; .8-1.3mc; 1.3-2.1mc; 2-4mc; 4-5.3mc; 5.3-7mc; 7-9.1mc. PWR: 24-28 vdc. MODULATION UNIT: (with tubes) 1—1625; 1—VR150; 1—1215. REMOTE CONTROL with key, less dynamotor..... **$109**

COLLINS ART—13 Transmitter, CW—260 watts; Phone—180 watts. Range: 2 to 18 mcs. Continuous tuning. Xtal calib. 28 vdc Dynamotor, with tubes..... **$375**

AIRBORNE EQUIPMENT COMPONENTS CONDENSERS (hermetically sealed, stud mounted)

A-5413—3x.22mfd. 300 vdc Sprague..... 98c
A-5415—.05-.01-.05 mfd 300 vdc 1⅛x1⅛ dia. Sprague..... 55c
A-5416—15 mfd 35 vdc 1⅛x1⅛ dia. Sprague. 50c
A-6350—5 mfd 300 vdc 2⅛x1 dia..... 95c
A-7715—.05 mfd 600 vdc 1⅛x1⅛ dia. Sprague..... 50c
A-7582—3 mfd 300 vdc Sprague..... 90c

FRACTIONAL H.P. MOTORS

MA-1350—DIEHL: 27 vdc/3.25 a; 3600 r.p.m. 1/30 hp..... $ 2.50
MA-1353—PINCOR shunt wound, 9000 r.p.m.; nt. ser. 24 vdc..... 2.25
MA-1354—G.E. shunt wound 24 vdc; 2400 r.p.m. 1/100 h.p..... 2.35
MA-1357—DIEHL selsyn, 400 cps/115 v, per pair..... 7.75
MA-1360—DYNAMOTOR, Westinghouse, G.E., others: 28 vdc input—250v/.060 amps out, new..... 13.25
Used, perfect..... 7.50
Other motors in stock. Send us your requirements.

SEND FOR FLYER

All merchandise guaranteed. Mail orders promptly filled. All prices F.O.B. New York City. Send Money Order or Check. Shipping charges sent C.O.D.

COMMUNICATIONS EQUIPMENT CO.
131 LIBERTY ST., N. Y. C. (6)
TELEPHONE WH 4-7658

PILOTS
CIVILIAN
ARMY NAVY
[ON RESERVE, INACTIVE AND ACTIVE STATUS]

$1.50 EACH ANY TYPE

ARMY PILOT
NAVY PILOT
CIVIL PILOT

NOW—a beautiful cast emblem of your own classification for display on your automobile state license plate.

- **Solid Construction**
- **Rust Proof**
- **Inch High Letters**
- **Easily Attached**
- **Aluminum Casting**

— Postage Prepaid —

T & P Emblem Company
Box 32 **Holden, Mass.**

T & P EMBLEM CO. ☐ Army ☐ Navy ☐ Civil
Box 32
Holden, Mass.
Gentlemen:
Please send me the above indicated emblem. Enclosed find $_____ for (Number)_____.
NAME _____
ADDRESS _____
CITY _____ STATE _____

MAIL YOUR ORDER TODAY!

How Much Is True About the Helicopter?

(*Continued from page* 39)

The helicopter hasn't "come of age" and the "helitaxi" isn't here. But supposing you can afford one of the current 'copters and that you can find someone to teach you to fly it, chances are that even after you've learned you'll not be too happy about your acquisition.

Much more stability must be built into the 'copter before it will satisfy the average customer. By that stability we mean the kind of engineering which makes the wheel of your auto return automatically to dead center after you've negotiated a curve, the sort of automatic dependability that only now (after 40 years of fixed-wing manufacture) is being built into a few of our lightplanes.

True, the best of the current crop of helicopters have fair directional and lateral stability but none has a dependable degree of longitudinal stability. One magazine report of the intricate job of flying a 'copter points out that the temperamental sensitivity of the 'copter's five controls, and the degree of co-ordination necessary to keep from overcontrolling, is enough to give pause to any novice flyer save one who'd get a kick out of piloting an uprooted palm tree in a Florida hurricane.

Unfortunately, effect of this debunking article was injured by its picture spread of a movie actress clowning at the controls of a 'copter. Humorous in intent, the total effect for at least 50 per cent of magazine "readers" (who read only the pictures) is a serious addition to the how-easy-it-must-be-to-fly hokum.

Even more serious is the high-powered hokum accredited to a potential west coast manufacturer of private helicopters. He asserts that he soloed a 'copter in 10 minutes—no less! But schools maintained by the armed services (and, incidentally, Bell has the only other helicopter school—one that is concerned chiefly with its own testing program) insist that it takes 27 hours solo and dual and 70 hours of ground schooling to create a helicopter pilot. And, so far, such schools have only accepted rated pilots as students, some of whom have as many as 4,000 hours of fixed-wing time. It's reported that four per cent of these wash out.

There is more, much more, that could be said in the same vein. If you land your 'copter in a crosswind and overcontrol a bit, you can easily dig the rotor tips into the ground. When that happens, repair costs will run into three figures.

Before the sky is filled with commuting 'copters some hokumless provision must be made for landing space. Office roofs aren't stressed for it and your 30-by-30 backyard isn't large enough—unless you're the sort of flyer who doesn't need a single inch to spare even in an emergency.

Air traffic regulations will require a completely new concept before 'copters cloud the sun. Sure, you can fly one forward or backward, straight up or down, you can even park it on a cloud. But only if you're an expert. To date there are less than 600 such experts. And if that group of experts were 'copter commuting to downtown New York or Chicago at the same time a far more tragic mess would result than those early morning auto traffic jams.

Only after all this kind of debunking can you really begin to evaluate the 'copter's current role. They've given a splendid wartime demonstration of their usefulness in effecting rescues and delivery service to otherwise inaccessible places. Contracts are already being studied that will utilize similar services commercially—from factory to downtown outlet, for instance. And certainly the original rescue role will become a permanent task for the helicopter in Coast Guard, Red Cross, and Government services.

News agencies are planning to photograph and, later, to televize news and sports events. Shuttle service from airport to business centers is more than a mere possibility. Plans are well nigh complete for mail service to suburban towns in at least two metropolitan areas.

Pipeline companies, railways, ranches comprise only a few of those companies and individuals who have arrived at the hard-boiled conclusion that they can make the 'copter pay, even if it is never developed beyond its present stage.

But if you're planning on a Buck Rogers jaunt to the office in a hopicopter, or a helicopter "sky hook" for your construction project, you'd better take a breather. For, even though a "Hopicopter," *sans* anything but rotor, has been flown, and even though the Germans had a 16-ton helicopter in construction which was designed to move tanks across unbridged rivers; any plan you, or your favorite aviation writer, may be cooking for the widespread use of such gadgets is still hokum. END

• • •

"AND THERE I WAS . . ."

FLYING will pay $10 for every "And There I Was . . ." item which is accepted. Address: "And There I Was . . .", FLYING Magazine, 185 N. Wabash Ave., Chicago 1, Ill.

A NAVY Hellcat *circled the Newark, N. J., airport. Asking for landing instructions, the pilot was told by a sweet feminine voice from the tower what approach to make, but to beware of ice on the runway. The tired pilot landed but, in the middle of the runway, hit his brakes too hard. He skidded badly, and luck was against him—only one brake worked. When he released it he found himself going backwards. Gunning his engine he managed to slow the plane so that when it slid into a ditch he wasn't hurt.*

"Is everything all right?" anxiously asked the pretty voice over the pilot's headset.

"Oh sure, darling," he snapped. "I always land this way!"

—J. William Welsh

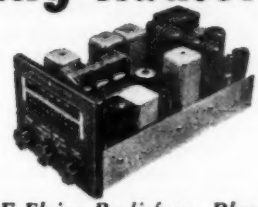
GLOBE selects G-E Flying Radiofone

DYNAMIC and trim, rugged and stable, the new all-metal Swift fulfills the fondest dream of the private pilot for an economical plane with power, speed, range, and easy maintenance. Here is a ship with performance that makes flying a pleasure—travel both fascinating and economical.

Modern in every respect, the Swift is equipped for the G-E Flying Radiofone for dependable two-way communication. With this radio, towers and radio range stations will report you "Loud and Clear". At the flip of a switch it will bring in more broadcast stations than you ever heard before—for listening pleasure or for homing.

The Flying Radiofone combines a 12-watt transmitter and a highly sensitive two-band receiver. It is small, compact, and sturdy. It is as simple to operate as a car radio—and economical to own. The new G-E plug-in feature of the transmitter-receiver unit and the power supply unit makes installation simpler—removal quick and easy.

Ask your G-E office for the name of your nearest Flying Radiofone dealer, or write: *Electronics Department, General Electric Company, Syracuse 1, New York.*



The G-E Flying Radiofone. Plugs directly into the glove compartment of the Swift.

- Longer Range
- Clearer Reception
- Low Battery Drain
- Simple to Operate
- Dependable 2-Way Communication with Fixed Antenna
- Range Voice Filter
- Long Tube Life
- Loop Operation
- 12 Watts Power Output
- 12 Tubes
- 12 pounds (radio and power supply)
- Compact and sturdy
- Plug-in Design for Easy Removal
- Reasonably Priced

Like Globe many other leading personal plane manufacturers are specifying the G-E Flying Radiofone.

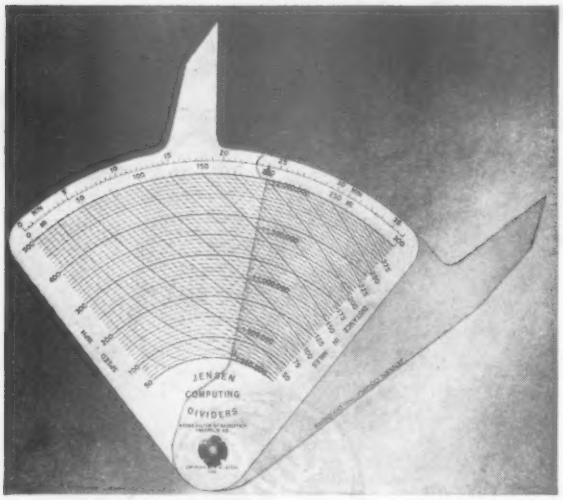
12 WATTS 12 TUBES 12 LBS.

THE G-E MONOGRAM FLIES IN ALL U. S. ARMY AND NAVY AIRCRAFT

GENERAL ELECTRIC

152-E5

WEEMS, *a famous name* in AIR NAVIGATION presents a New, Post-War COMPUTING DIVIDER



JENSEN COMPUTING DIVIDER

This new universal computing divider combines a computer for working Speed-Time-Distance problems with a convenient plastic divider. Seven inch legs. This instrument solves the problems *graphically* and saves the usual computations. Designed by Captain H. M. Jensen, U.S.N. Retired, for use with any scale chart and for any Air Speed.

With instructions . . . . . $4.

Buy Weems Instruments and texts; including the famous Weems Aircraft Plotter Mark II ($2), Dalton E 6-B Computer ($10), Dalton Mark VII Computer ($5) at any aviation supply store.

WEEMS RESIDENT AND HOME STUDY COURSES IN NAVIGATION

ENROLLMENT APPROVED UNDER G. I. BILL OF RIGHTS AND PUBLIC LAW 16

Air and Marine Navigation Courses at resident school at Annapolis or by mail. Instruction by experienced navigators and teachers. Latest methods and equipment used. Resident courses include practical work. Write for particulars.

GET YOUR COPY OF THE WEEMS CATALOGUE

AIR WSN WEEMS SEA SYSTEM OF NAVIGATION
ANNAPOLIS, MARYLAND

Flight Training and the GI Bill

(*Continued from page* 18)

the program. These fears have centered on two possibilities:

1. That a host of "racket schools" will spring up to victimize the veteran and enjoy a jamboree with Government funds. This could lead to public revulsion, and elimination of flight training by Congressional action.

2. That veterans will be tempted to spend their educational benefits on flight training in expectation of getting full-time flying jobs. Since only a small percentage of pilots could hope for such jobs this could lead to bitter reactions against flight schools and aviation in general.

Governmental agencies have moved quickly to meet the first possibility. Individual state agencies—not the Veterans Administration—are responsible under the law for determining what schools are suitable for veteran training. However, the Veterans Administration has considerable indirect control of the schools. If students fail to make satisfactory progress at a particular school, for example, funds for veteran training may be withdrawn. And Veterans Administration is setting up the machinery for frequent inspection of the schools.

For several years the Civil Aeronautics Administration has had a set of definite standards for approved flight schools. CAA-approved schools, since they meet high standards of teaching, curriculum, and equipment, are permitted to qualify a student for a private license with a minimum of 35 hours of flight time, as compared with a 40-hour minimum in a non-approved school. For a commercial license, a minimum of 160 hours is required in a CAA-approved school, against 210 in a school lacking this approval.

T. P. Wright, Civil Aeronautics Administrator, has written the governors of the 48 states offering help in setting up state flying-school standards based on CAA minimum requirements. This move is backed by the Aeronautical Training Society and also by the United Pilots and Mechanics Association.

Replies from the governors indicate that, in general, state flying school standards will at least equal CAA minimum requirements. Adoption of such standards, plus increasing supervision of the schools by the Veterans Administration, promises to make operation of "gyp schools" difficult—at least for veteran training.

The second problem—lack of flying jobs for flight school graduates—hinges on honest information reaching the veteran, and on his own judgment. Foresighted flying-school operators have expressed ideas like those of Maxwell W. Balfour, vice president of Spartan School of Aeronautics, who fears he might "become the grandfather of 200,000 unemployed pilots."

Spartan will not give flight instruction except where the student takes engineering, mechanic and similar extensive ground courses.

"We won't give flight instruction alone," Mr. Balfour says, "for the reason that, except for a few trained pilots who need brief finishing-off courses, flight instruction alone doesn't make sense for the newcomer who wants to earn a living in aviation."

The Department of Labor's most "optimistic" figures call for 10,000 new airline pilot jobs by 1950 and 22,000 new non-scheduled pilot jobs. The veterans' flight training program, plus extraordinary expansion in cargo operations, might possibly double the latter figure. But no one can seriously imagine more than perhaps 75,000 full-time flying jobs in the next five years under any circumstances. And there is a backlog of 200,000 pilots trained by the armed forces—many of them with thousands of hours of experience in the air.

A CAA form letter used to answer letters from veterans about flight training says in part:

"Once you have exhausted your tuition allowances, all your rights to education under the GI Bill are gone. You should think carefully, therefore, before deciding how you wish to use your education opportunity.

"More and more people, in the immediate future, will be able to afford their own private planes for business and pleasure. And it is a real thrill to rent a plane for a few hours of flying on a sunny weekend or for a cross-country hop.

"Certain veterans may wish to use their educational rights to learn flying just for fun—and we can suggest no more satisfying hobby. Other veterans will find a pilot's license

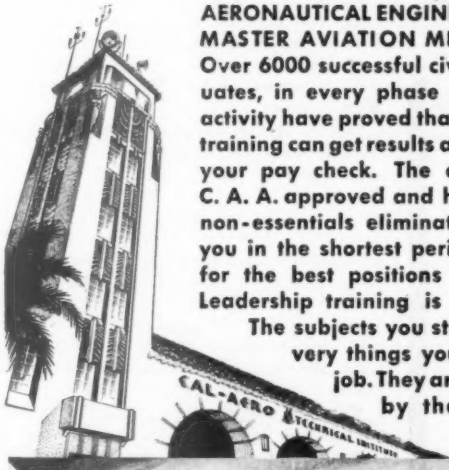
AVIATION CAREER

MAXIMUM TRAINING IN MINIMUM TIME

Opportunity in Aviation was never greater. Prepare for it wisely, with thorough, practical, intensive and up-to-the-minute training, using modern equipment and facilities.

CAL-AERO CAREER TRAINING ...will ADD DOLLARS to YOUR PAY CHECK all the rest of YOUR LIFE!

CAL-AERO TECHNICAL INSTITUTE OFFERS YOU JUST THE TRAINING YOU NEED. . . . . Since 1929 Cal-Aero has specialized in AERONAUTICAL ENGINEERING and MASTER AVIATION MECHANICS. Over 6000 successful civilian graduates, in every phase of aviation activity have proved that CAL-AERO training can get results and increase your pay check. The courses are C. A. A. approved and have all the non-essentials eliminated to train you in the shortest period of time, for the best positions possible... Leadership training is stressed... The subjects you study are the very things you do on the job. They are approved by the Aviation Industry, the very men who will employ you and know today's requirements and the exact kind of training you must have. . . . . *We invite your consideration, investigation and comparison. Send coupon TODAY.*



Veterans

Cal-Aero Technical Institute has been approved for Veterans' Training under the G. I. Bill of Rights. Veterans attending Cal-Aero are eligible for the educational benefits as provided by this Bill. Hundreds of ex-servicemen are now attending, taking advantage of these benefits here at Cal-Aero. WRITE US...We will be happy to help you with your future plans.

TRAIN IN SOUTHERN CALIFORNIA

CAL-AERO TECHNICAL INSTITUTE

FORMERLY CURTISS-WRIGHT TECHNICAL INSTITUTE

BE WISE...PROTECT YOUR FUTURE

MAIL TODAY · DON'T DELAY

SEND FULL INFORMATION AND CATALOGUE FREE ON COURSE CHECKED BELOW

- ☐ AERONAUTICAL ENGINEERING COURSE
- ☐ MASTER AVIATION MECHANIC COURSE
- ☐ SPECIALIZED ENGINE COURSE
- ☐ SPECIALIZED AIRPLANE COURSE
- ☐ POST GRADUATE AERONAUTICAL ENGINEERING COURSE
- ☐ SPECIALIZED AIRCRAFT SHEET METAL COURSE
- ☐ AERONAUTICAL DRAFTING COURSE, HOME STUDY
- ☐ AIRCRAFT BLUE PRINT READING COURSE, HOME STUDY

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

DATE OF BIRTH _____ 8-6

GRAND CENTRAL AIR TERMINAL

1225 AIRWAY — GLENDALE 1, CALIFORNIA

(LOS ANGELES COUNTY)

UNDER PERSONAL SUPERVISION OF MAJOR C. C. MOSELEY, PRESIDENT AND FOUNDER SINCE 1929...ON OUR OWN HUGE AIRPORT—IN HEART OF THE AIRCRAFT INDUSTRY

Save a Place for It in Your Private Plane

THE VHF
Raytheon Radiophone

The VHF Raytheon Radiophone will bring to private plane owners all the advantages of VHF transmission, plus features found only in the Belmont-built Raytheon Radiophone.

Pilots are assured not only of reliable transmission on VHF channels, but they can receive signals on low frequency ranges also. Continuous coverage is provided in the low frequency range from 190 to 425 kc and 540 to 1600 kc, as well as the 75 mc channel.

Pilots and owners are invited to investigate the VHF Raytheon Radiophone—now.

For ease of servicing, entire unit can be removed and replaced with another Radiophone in a matter of minutes. • Receiver performance comparable to commercial airline standards. • Crystal controlled transmitter never drifts off frequency. • Power output of transmitter ATR-10—4 watts. • Two vibrators operate independently—easily switched while in operation. • Height 5", width 5¼", depth 14¼". • Weight 14 pounds. • Equipped with range filter, push-to-talk microphone, transmitter output indicator, long life Raytheon Tubes and provision for direction finder loop. • Ample power for loud-speaker operation. • Stub antenna, only 21 inches high.

BELMONT RADIO CORPORATION
A Division of Raytheon Manufacturing Company • 5947 W. Dickens Ave., Chicago 39, Ill.

AERONAUTICAL UNIVERSITY

• You will make no mistake in choosing Aviation for your postwar career. Tremendous opportunities are in sight—and those who are best trained will get top positions.

Prepare for your entrance into key positions in Aviation by intensive training at this oldest fully approved aeronautical school. Courses in:

• AERONAUTICAL ENGINEERING—B.S. DEGREE
• ENGINE MECHANICS
• SPECIAL A. AND E. MECHANICS REFRESHER AND COACHING COURSES FOR U.S.C.A.A. EXAMINATIONS
• ADMINISTRATIVE COURSES—INCLUDING SALES

Founded by Curtiss-Wright. Outstanding faculty, modern equipment. Day, evening. Placement service. Send today for free illustrated catalog—"Opportunities in Aviation."

AERONAUTICAL UNIVERSITY
Dept. 2, 116 South Michigan Avenue, Chicago 3, Illinois

U. S. Government pays for qualified veterans' attendance at Aeronautical University

(Member of the National Council of Technical Schools)

AERONAUTICAL ENGINEERING
B.S. Degree in 27 Months. Courses also in Civil, Electrical, Mechanical, Chemical, Radio Engineering; Business Admin., Accounting, Sec'l Science. Low tuition. Low living costs. 63rd year. School now filled to capacity. No applications can be accepted until further notice.
TRI-STATE COLLEGE 766 College Ave. Angola • Ind.

TARIFFS—
TRAFFIC CONSULTATION
(The answer to the Carriers' problems)
ELMER AHL
HUNTINGTON PARK Calif
Phone: (Los Angeles) LUcas 7207.

very useful in connection with ground jobs, both in and out of the aviation field. Some veterans, however, are asking themselves, 'Will flight training help me get and hold a full-time commercial flying job?' If you are asking yourself this question, remember that the supply of well-trained Army and Navy pilots probably will exceed the number of full-time flying jobs for years to come . . .

"We don't want to discourage you—we're enthusiasts about flying, ourselves. But we believe that every veteran is entitled to know the facts about the present labor market before he makes up his mind how he wants to use his educational rights under the 'GI Bill.'"

Mr. Weishaar, whose organization includes many long-established flight-school operators, feels that schools must use judgment in selecting veteran trainees.

"The veteran should understand clearly that a commercial license will not get him a full-time flying job, except in rare cases," Mr. Weishaar said. "The exception might be an Army or Navy pilot who needs a little extra training, such as an instrument rating.

"A private pilot's license, on the other hand, can be useful in many kinds of aviation ground jobs and it will be useful in a growing number of jobs outside the aviation field. A reasonable amount of flight training makes sense as part of a liberal education.

"There is no need for any school to lure unqualified veterans with promises of airline pilot jobs. There are plenty of veterans with ordinary ground jobs who have no need or desire for additional formal schooling. Such veterans will obtain lifetime benefit by using part of their educational benefits for a private pilot license.

"Many members of the Aeronautical Training Society have ridden with aviation through bad times as well as good. They don't want the veteran training program to turn into a big boom followed by a big bust. We believe that all aviation, including flight schools, will benefit by giving reasonable amounts of flight training to veterans who will be helped by it. We want lifelong friends and customers for aviation — not embittered youngsters who feel they have been cheated out of educational benefits."

Commenting on this particular phase of the problem, the Ohio State Aviation Board admits that the private pilot license "seems to lead to a certificate for private or avocational use without apparent commercial benefits." But the Board's summary goes on to point out that "upon more thorough analysis, . . . the certificate has broad commercial value." The board bases its opinion upon the fact that an increasing number of civilian positions require flying skills.

T. P. Wright, who as CAA Administrator is charged with "fostering and promoting civil aviation," believes that the flight training program can be valuable in the long-range aviation picture.

"We are hopeful," he says, "that the program will avoid serious pitfalls and be of tremendous overall benefit to the veterans and the aviation industry alike." END

YOUR FUTURE IN A VERY FEW WORDS...

The aviation industry is still growing . . . it is now entering the global transportation stage. In this world-wide industry, the first need is for ***trained*** personnel. It's no longer a matter of going out and getting a job; you must train for the position you prefer. At Spartan — the University of Aviation—are 50 acres of educational facilities devoted exclusively to that purpose.

Spartan has prepared for you a "Master List of Opportunities in Aviation". It tells of the positions . . . the duties . . . the working conditions . . . the advancement possibilities and the training it takes to get in this field.

. . . YOUR "Master List of Opportunities in Aviation" will be sent on request. Don't miss it. Clip and mail this coupon today!

SPARTAN
UNIVERSITY OF AVIATION

SCHOOL of AERONAUTICS
CAPT. MAXWELL W. BALFOUR

COLLEGE of ENGINEERING
DIRECTOR, ADDRESS DEPT. F86

TULSA, OKLAHOMA

Maxwell W. Balfour, Director
Spartan School of Aeronautics
Department F86, Tulsa, Oklahoma

Please send my "Master List of Opportunities in Aviation" immediately. Also your latest catalog.

Name _____ Age _____

Address _____ City _____ State _____

Indicate which branches interests you:

Flight	Instruments
Mechanics	Aeronautical Engineering
Radio	Airline Maintenance Engineering
Meteorology	Management and Operations

Spartan is fully approved for training under the G. I. Bill of Rights

"From DODO to AIRCRAFTSMAN — in only 48 weeks!"

"... and doing fine, thank you, as a licensed* aviation mechanic in charge of a CAA approved maintenance station. Take my tip, whether you're a farm boy or an experienced, ex-Air Force crew chief—one of the Roosevelt Aviation School courses can help you."

*CAA requires that periodic inspections given all aircraft be approved by licensed mechanics.

You can become an ENGINE or AIRPLANE MECHANIC in 24 weeks—or both in 48 weeks. All courses qualify you for CAA license exams, providing you are 18 or over when you graduate. Air lines and airport operators are placing calls for more licensed mechanics than there are graduates. Study where planes fly—at famous Roosevelt Field. Why delay? Send coupon **today!**

NEXT CLASSES BEGIN FEB. 3, MARCH 3, 1947

APPROVED FOR VETERANS UNDER G.I. BILL

ROOSEVELT AVIATION SCHOOL
MINEOLA, LONG ISLAND, N. Y.
Phone Garden City 8000

ROOSEVELT AVIATION SCHOOL 8-46
Hangar 23, Mineola, L. I., N. Y.
I'd like to know how I can become a licensed Engine ☐ or Airplane ☐ Mechanic in six months or both ☐ in 48 weeks.

NAME..... Age.....

ADDRESS .....

ALUMINUM — AIR DRIVEN RIVETING GUNS

A REAL VALUE AT $9.95 PREPAID

Manufactured by these nationally famous concerns: Ingersoll-Rand, Cleveland Pneumatic and Chicago Pneumatic. An excellent tool for chipping as well as riveting.

WRITE for information on our complete line of AN parts. Nuts, bolts, screws, rivets, hydraulic actuators, etc.

SLIGHTLY USED BUT
GUARANTEED
TO BE IN PERFECT WORKING CONDITION

When ordering, specify what type and brand of riveter you desire. We have a complete line in stock. Mail orders given prompt attention.

ART'S SURPLUS MART DEPT. F8
1329 W. Florence Ave. LOS ANGELES 44, CALIF.

Build These Popular Cleveland Models

38", P-61 BLACK WIDOW. Industrial Training Model. C-D Kit T-155..... $1.50

Send 5c for Catalog

Mitchell B-25 Bomber 38", C-D Master Flying Model Kit SF-125..... $3.50

Mustang P-51 Span 26 3/16", MFM Kit SF-91..... $3.00

See your dealer first. If he can't supply you, order direct, including 20c extra for packing-postage.

CLEVELAND MODEL & SUPPLY CO.
4512H4 Lorain Ave. Cleveland 2, Ohio, U. S. A.

The 8th Sees ENGLAND

New—Exciting! AAF Pictorial of your stay in the ETO. You'll thrill to over 250 pictures of air combat—fighters—bombers—flak—London—Norwich—Ipswich and many others. Postpaid $3.00. Send check, money order or C.O.D. Now to Dept. C.

AAF PUBLICATIONS,
6015 West Third St.,
Los Angeles 36, Cal.

London Letter

(*Continued from page 55*)

Capt. Max Aitken, D.S.O., son of *Daily Express* Proprietor Lord Beaverbrook, as president, was formed in July last year and is better known.

There has been a clash between them on matters of policy but now there are signs of reconciliation and in the end your correspondent thinks that they may amalgamate. That, at least, seems the most logical thing to do.

Companies in Britain working on helicopters are the Fairey Aviation Company, the Bristol Aeroplane Company and the Autogiro Company All tend now toward the academic. The Autogiro Company has been going that way ever since the death of Don Juan de la Cierva (whose patents all helicopters use). The only man in the British Isles with wide practical helicopter knowledge—some of which was gained in the United States—is Fairey's Wing Comdr. R. A. C. Brie.

The Fairey Company calls its helicopter a "gyrodyne." Details have not been given. It seems that the only difference concerns the torque rotor which is used as a rudder. In the gyrodyne the torque rotor is mounted on a fore-and-aft axis like an ordinary aeroplane propeller, but on outriggers to one side of the body. The Sikorsky has the torque rotor on an axis across the aircraft. The gyrodyne is not expected to be flown for some months.

Gas Turbine Development

New gas turbines announced during the past few weeks have included the Rolls-Royce *Nene* and *Clyde*, the de Havilland *Ghost* and the Armstrong Siddeley *Python*. *Nene* and *Ghost* have a static thrust of 5,000 pounds each and are the biggest British turbojets to go into full production. We believe here that they are the most powerful units of this kind in the world. And the *Nene* is going up in output almost every week. On test it has been giving 5,500 pounds thrust and that is by no means the maximum limit of this engine.

The *Clyde* is especially interesting because it is something new in jets. It is a form of propjet—that is, a contra-rotating propeller is driven off the shaft. But the special feature is that there are two compressors and two turbines on concentric shafts. One compressor is an axial flow, nine-stage, the other a centrifugal, single-stage. One turbine drives the axial impeller, the other drives the centrifugal impeller

Another Personal Plane

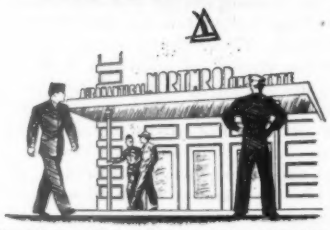
It is a pleasure to be able to report progress with one more of Britain's personal aircraft. This is the Shapley *Kittiwake*—a pre-war design. A real effort is being made to get this two-seater on the market—the provisional price being $3,600. Wing span is 32 feet, length 20 feet 10 inches. All-up weight is 2,600 pounds. The Shapley Aircraft Company at present has it headquarters located in Devon. END

XB-35, *revolutionary aircraft designed and built at Northrop field by Northrop engineers. Wing span: 172 feet; gross weight: more than 104 tons*

YOU Can Prepare for an AVIATION CAREER at Famous Northrop Field

Enrollment reservations are now being accepted at Northrop Aeronautical Institute for training in Aeronautical Engineering and Aircraft and Engine Mechanics. As a student on Northrop Field, you can learn aviation under the supervision of one of the foremost aircraft engineering and research organizations. Throughout your entire future career you will benefit from your close association with Northrop. Send the coupon today for full information.

APPROVED FOR THE TRAINING OF VETERANS Under the G. I. Bill of Rights



Enjoy Completely New Training Facilities

You enjoy your training and learn more easily, using modern equipment and facilities. At the Northrop Aeronautical Institute, even the specially designed school buildings are new... and located on mile-long Northrop Field, in the midst of Northrop engineering, research, and production plants and laboratories.

Aeronautical Engineers Needed

Opportunities in aviation are tremendous—CAA and other responsible sources estimate *hundreds of thousands* of new jobs. The best positions will go to trained men. Invest your time now in thorough training at Northrop! Then enter aviation *fully prepared* to take advantage of the best opportunities.

Live in Sunny California

Northrop Field is located between the Pacific Ocean and the Sierra Mountains, near downtown Los Angeles and Hollywood. You can enjoy Southern California—ocean surfing and bathing, skiing, all-year tennis, desert and mountain hiking and riding, plays, music, parks and other entertainment.

DEDICATED TO THE ADVANCEMENT AND

NORTHROP
AERONAUTICAL INSTITUTE

1545 EAST BROADWAY
HAWTHORNE, CALIFORNIA

TRAINING OF MEN FOR CAREERS IN AVIATION

SEND COUPON FOR FULL INFORMATION

NORTHROP AERONAUTICAL INSTITUTE
545 East Broadway, Hawthorne, Los Angeles County, California

Please send me your free, illustrated booklet and information, including starting dates and tuition rates, on the training course checked below.
☐ Aeronautical Engineer ☐ Master Aircraft and Engine Mechanic (A&E)

(Name) _____

(Address) _____ (Age) _____

(City) _____ (Zone) _____ (State) _____

Check one: ☐ Veteran ☐ In Service ☐ Civilian

Make Money in Postwar Aviation
Be an
INSTRUMENT TECHNICIAN

Permanently profitable careers will be open to men who become specialists in aircraft instruments, through A.S.A.I. training. For every type of plane—for airlines, commercial, private and military flying—skilled technicians will install, test and repair the extensive instrument sets required by modern aviation. These will be interesting, well paid positions, with a real future. Great networks of global airlines will demand trained specialists for instrument maintenance. *Now* is the time to prepare for this growing field, at American Schools of Aircraft Instruments.. oldest instrument school in America

VETERANS! SERVICEMEN!
American School of Aircraft Instruments is among the schools approved by the Veterans Administration, so that discharged veterans who attend are eligible for educational benefits under the G. I. Bill of Rights.

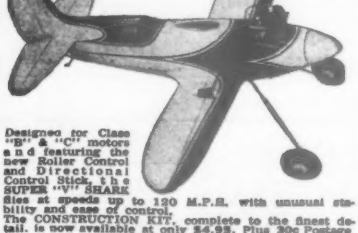
AMERICAN SCHOOLS OF AIRCRAFT INSTRUMENTS
Dept. F-20
Including Accredited Watchmaking School
5255 W. San Fernando Rd., Los Angeles 26, Calif.

SEND TODAY
for this Interesting 24-page Booklet

AMERICAN SCHOOLS OF AIRCRAFT INSTRUMENTS, Dept - F-20
5255 W. San Fernando Rd., Los Angeles 26, Calif.
Please send me your illustrated 24-page booklet and full information on the MASTER INSTRUMENT TECHNICIAN Course
Name _____ Age _____
Address _____
City _____ Zone _____ State _____
Check One: ☐ Veteran ☐ In Service ☐ Civilian

SUPER G-LINE MODELS
Now Available

The SUPER "V" SHARK
New Control Line Sensation
Class "B" & "C" Motors



Designed for Class "B" & "C" motors and featuring the new Roller Control and Directional Control Stick, the SUPER "V" SHARK flies at speeds up to 120 M.P.H. with unusual stability and ease of control. The CONSTRUCTION KIT, complete to the finest detail, is now available at only $4.98. Plus 30c Postage
Descriptive Literature 5c
VICTOR STANZEL & CO. Dept. F SCHULENBURG, TEXAS
First In Control Line Flying

AOPA News

(Continued from page 62)

unnecessary. It is impractical because there are only a handful of places where this may be accomplished and the pilot in many cases would have to fly hundreds of miles to have the job done. It is unnecessary, we believe, because the manufacturers of crystals state that they can produce and guarantee stable crystals for the life of the radio set. Why, then, is it necessary to retain the frequency check requirements?

AIR MARKING PLAN HITS SNAG

In an effort to get national air marking on some quick practical basis, AOPA recently recommended to CAA and the Post Office Department that all U. S. Post Office buildings be used for roof marking. Hard-working Blanche Noyes, air marking specialist for the CAA, reports that the Public Roads Administration had poured cold water on the plan and advised that (1) there were no funds available for installing and/or maintaining the markers, (2) many Post Office building roofs have slag coverings with a thick coat of loose gravel which constantly shifts, (3) most of the Post Offices in towns are housed in buildings which are leased for periods of three to five years and the Post Offices are subject to being moved when the lease expires, etc.

Some of these objections seem to reflect more a lack of interest than a lack of solution, we believe. Plans are going forward to restudy the matter—also the possibility of using schools or other large buildings having metal roofs. Mrs. Noyes reports that little difficulty is being reported in getting roof releases from owners.

AOPA has reprinted its air marking leaflet to comply with recent changes and any AOPA Unit working on air marking projects should correspond with national headquarters for a supply. END

Letters

(Continued from page 6)

by precise mathematical computations and so makes the map replete with isogonic lines, and longitude and latitude. Won't someone tell Coast and Geodetic that we privates fly contact? Their maps are beautiful pieces of draftsmanship but when I fly cross-country I'd much rather have a map which is realistic. Those green areas are my pet peeve. The map legend says "green areas 0 to 1,000 feet." When I fly cross-country I want to know what the terrain is going to be like aside from how high it is.

As for airports—why don't those maps tell whether an airport is paved and something about the size and local traffic rules? Wouldn't the back of every C & G map be a swell place to find a detailed description of every airport on that particular map?

As for landmarks and obstructions—in flying from Milwaukee to West Bend, Wis., for instance, there is a high hill off to the left with a large church on top of it. Off to the right are two huge smokestacks at Port Washington. Excellent landmarks, but they aren't on the map. And at Annapolis, Md., the Navy has nine enormous radio masts 600 feet high. They're not on the map.

And roads—lots of main highways are shown. But they don't all look alike as shown on the map. Some are all black, some concrete, some half and half. It helps a lot to know what color of main highway to look for. So I fly by road maps and intend to continue doing so until C & G puts out some useful ones.

R. J. WHITTIER
Stoughton, Mass.

● FLYING sent a copy of Mr. Whittier's letter to U. S. Coast and Geodetic Survey in Washington and received the following reply from Mr. J. S. Morton, Chief Aeronautical Chart Branch:

"Thanks for the copy of the letter criticizing the sectional charts. Am glad to get the criticisms and to make some suggestions. Private plane pilots as a group are hard to contact regarding their requirements in charts and their criticism is about the only guide we have as to what they need.

"The facilities shown on aeronautical charts are constantly changing so by the time a chart is published some of the information is incorrect. To meet safety requirements all charts are revised and published semi-annually. The Bi-Weekly Notice to Airmen carries current information and should be used to supplement the charts. Your correspondent can get on the mailing list for this publication by applying to the Civil Aeronautics Administration. These charts are designed for various classes of pilots so must show various air navigation facilities in addition to the topographic base. However, the aeronautical data (magenta overprint) has become so heavy in some areas that the topography is obscured and it will be necessary to leave off some of this information to help the contact pilot.

"Most of the 'restricted areas' have been abolished and are not shown on current charts but a large number of 'danger areas' are still in effect—mostly military training areas.

"Regarding the layer tints to indicate elevations, we follow standard cartographic practice for topographic maps and charts. Considerable thought has been given to using colors which would give a better picture of what the pilot sees, but there are so many seasonal changes that it is considered impractical.

"A change is planned in airport symbols and notes which will give the information required by most flyers—length of runway, surfacing lights, facilities.

"About the specific points in the letter: (1) We would be glad to add the church on a hill between Milwaukee and West Bend as a landmark if he will supply the information. It has not been noted before. (2) The smoke stacks at Port Washington were noted by our flight checker and will be added on the next issue of the chart. (3) The chart carries a note regarding the radio towers at Annapolis."

J. S. MORTON
Washington, D. C.

Classified Advertising

RATE: 8c PER WORD FIRST 15 WORDS $1.00

AIRPLANES FOR SALE

AERONCA

AERONCA side by side, NC21096, Cont. 65, 160 hrs. since new cover and A major, 100 hrs. since E major, no time since 100 hr. and relicense, new tires, new prop., new glass, steerable t.w., never cracked, always hangared, privately owned, $1650.00. Will deliver for expenses. Elmer H. Fisher, Ashland, Ohio.

AERONCA Super Chief 1941 C65, Private owner. Always hangared. Never cracked. Excellent condition. No trade unless on 1946. Sacrifice at $1875 same plane advertised last week $300 more. Perry Philips, Columbia, Mo.

AERONCA-KCA. NC21080. Mfg. July 1938, Cont-50, dual ignition, total 195 hrs. since new, 18 since top. Aircraft, total 846 hrs. 186 since complete recover and upholstery job. Dec. '43. New windshield-Aug. '45. 18 hrs. since 100 hr. inspection and new Sensinich prop., Feb. '46. Cruises 80 on 3½ gal. gas. $1250.00. L. H. Bowen, 4038 Oberlin, Houston 5, Texas.

2 AERONCAS. L3B. 1944. C65. engines. Licensed. 315 hrs. and 345 hrs. since new. Good clean trainers. $1635 and $1525. American Aircraft Corp., Municipal Airport, Knoxville, Tenn. P. O. Box 1509. Phone 2-4286.

1943 AERONCA Tandem L3C, 65 h.p. Dual Ignition Continental Engine 38 hrs. on Engine Since Major Overhaul, $1400. Standard Air Service, Glen Burnie, Md.

1941 AERONCA Chief, 65 h.p. Dual Ignition Lycoming Engine, Excellent Condition, Just Completely Rebuilt, New Grade A Fabric, Engine Majored, New Interior, Sensitive Altimeter, Rate of Climb, Turn and Bank. Relicensed May 1946. A Beautiful Two-Passenger Cross Country Airplane for $2150.00. Standard Air Service, Glen Burnie, Md.

1939 AERONCA Chief, A65 h.p. Single Ignition Continental Engine, 25 Hours on Engine Since Major Overhaul, Hand-rubbed Finish, Steerable Tailwheel, Brakes. Excellent Condition. Relicensed April 1946. A Very Good Buy At $1445.00. Standard Air Service, Glen Burnie, Md.

1938 AERONCA Chief, 50 h.p. Single Ignition Continental Engine. Fuselage Recovered Grade A Fabric Spring '45. 15 Hours on Engine Since Top Overhaul. Relicensed May 1946. $1350.00. Standard Air Service, Glen Burnie, Md.

AERONCA-65TF-Licensed. Only 90 hours on engine since major. Only $1195.00. Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas.

AERONCA Tandem. NC31765. No time since engine major with new crankshaft, etc., and 100 hour inspection. Total 1018:00 on aircraft. Perfect condition. $1595. Abilene Aviation School, Municipal Airport-Highway 80, Abilene, Texas.

AERONCA Chief, NC22471, 1300 total hrs., never cracked up, 150 since major, recovered recently, new magneto. Make an offer. Andalusia Airport, Andalusia, Ala.

AERONCA Chief 1942, Cont. 65, Blue and orange, engine just topped, radio, $1850 —also Aeronca Cont. 65 Tandem 1942, Solid red, engine just topped, $1600.00. One SR5A Stinson four place, fully equipped for charter service, $4000.00. All ships flying daily. Information and pictures on request. Chastain Flying Service, Chastain Airport, Prichard, Ala.

BARGAINS—Aeronca C-3 Wings $49.00. E113B Engine Parts, Continental A-40 Engine Parts, Genet 5 cyl. 80 H.P. Motor complete $75.00, Nicholas-Beazley landing gear, $9.00, Taylorcraft Cont. A-40 Airplane only $675.00. Charles Opalack, 1143 Cherry, Pottstown, Penna.

WANT A JOB?

Your ad in these columns will be read by personnel managers and executives of aviation companies in need of manpower.

SPECIAL TO EX-SERVICEMEN:—Your "Position Wanted" ads will be run in **two** consecutive issues for the price of **one.** Assure your future with a FLYING ad!

ARROW

ARROW F, low time, recent engine overhaul. Always hangared, very good condition, two way radio. Must sell immediately. $700.00. Information write Lt. A. Patton, VMF 222, Oak Grove, New Bern, North Carolina.

ARROW SPORT, 2-place bi-plane, less engine (requires 65 hp), $150.00. Lawrence Allison, 632 North 7th, Lawrence, Kansas.

BEECH

BEECH (Parts, Supplies, etc.). New P&W 450 Wasp Jr. Only 112 hours total time. $1995 F.O.B. St. Louis, Mo. Act today. A. Rudy Hruska, Aero Supplies, 706 Chestnut, Phone CE6281.

BELLANCA

BELLANCA Cruisair NC28975. Franklin 120 HP. Two-way radio and retractable gear. Very clean inside and out. Perfect condition. $5000.00. Abilene Aviation School, Municipal Airport-Highway 80, Abilene, Texas.

BIRD

BIRD, 3 place open Biplane, 40 hours since Major and relicense, perfect condition, $750.00 fly away. Hilton Flying Service, Hilton Airport, Hilton, N. Y.

BOEING

BOEING PT-17, low time, never been flown since licensed. Painted red and silver. Wichita Falls Air Transport Co., Box 809, Phone 6510, Wichita Falls, Texas.

BOEING A75NI. Built 1943—500 hours since major, 2000 hours total on Airframe & Engine. N262794. Clean and well rigged. Hangared at Alexander Valley Airport, Healdsburg, Calif. Price is $1700.00. (Seventeen hundred dollars). J. W. Salz, 301 Tenth St., Santa Rosa, Calif.

BOEING A75NI, Continental Engine, 220 h.p., built 1943, total hours 1500. 25 hours since last major on engine. Schlosser Flying Service, Durand, Wisconsin.

CESSNA

CESSNA UC78. NC62186. Completely reupholstered in Deep Maroon with new headlining and false floor. Wings and tail group recovered. Ship finished in red with blue trim and polished aluminum surface on cowlings and nacelles. Total of 810:00 on aircraft with 113:20 on engines since major. This airplane is in perfect condition. $12,500.00. Abilene Aviation School, Municipal Airport-Highway 80, Abilene, Texas.

NEED MANPOWER?

Your company's ad in these columns will reach over 244,000 readers—many of whom have the ideal background required to properly fill that position you have open. If you need pilots, mechanics, dispatchers, engineers, or other aviation personnel get your ad placed in the next issue.

CESSNA UC 78—Heavy Wing. Airplane Total Time—602. Engines Total Time—602. 100 hours since licensed by CAA. No restrictions. 24 volt system—2 batteries—2 generators. Primary and secondary instruments. 2 way radio, Brown leather upholstery. Hamilton Standard constant speed props. Color—silver trimmed in gold and blue. Condition of airplane throughout—excellent. Price $10,800.00 FOB Location. Plane located at White Flying Service Corp., Teterboro, N. J. Air Terminal. Write—Novadel-Agene Corp., P.O. Box 178, Newark, N. J. Att.: J. W. Tiernan.

CESSNA T-50, $9500. 196 hours on engines since new. Five place, licensed night and day instrument. Was owned and modified by Globe Aircraft. Silver trimmed in blue. New gray blue upholstering. Will fly to you for inspection for half expenses. Excellent condition, $9500. Harrington Air Service, Inc., Mansfield, Ohio.

TWIN engine Cessna. Sacrifice. Licensed 5 place. 37 hours ago. One owner, one pilot, special interior with curtains, hand rubbed finish, low engine time. Hangared all winter, now flying. Located Newark area. $8500.00. R. Foote, 42 W. Holly St., Cranford, N. J.

CESSNA UC-78: Just licensed for five place. 10 hours since top overhaul. Only 610 hrs. total. Never used for training. Always hangared. Equipped with two-way radio in nose, blind flight group, baggage door, new tires, constant speed propeller, auxiliary tank, battery moved under co-pilot seat. Refinished in beautiful opalescent blue, trimmed in red with cream stripe. Hand rubbed finish. Reupholstered with luxurious fabric. Priced to sell. Will deliver for expenses. Becker Aircraft Sales Company, Allegheny County Airport, Pittsburgh, Pennsylvania.

TWIN engine Cessna, low time, new cover, sound proofed, new interior, special hammock seat, baggage door, high gloss hand rubbed finish. Wichita Falls Air Transport Company, Box 809, Phone 6510, Wichita Falls, Texas.

CESSNA T-50. Serial 6514. Licensed 2/21/46. 185:00 since first major overhaul engines. Constant speed props. 5 place, refinished orange yellow, trimmed Stinson green, reupholstered, two transmitters, two receivers. Moved and converted, battery moved, flares, new tires, baggage door, instruments checked, licensed day and night instrument, hood and glass for simulated instrument. $10,500.00. Carl Hempel, Box 41, Lambert Field, Mo.

CESSNA twin heavy wing, constant speed props, NC59551, five place, interspring seats, full blind flight night instruments, two-way licensed radio, 170 hrs. total time since new. Cream, red. $8500. W. R. Goddard, Municipal Airport, Ardmore, Okla.

CULVER

CULVER Cadet 1941. 52 hours since major; rate of climb, ball bank, sensitive altimeter. Transmitter and receiver, Sensenich cruising propeller gives 135 cruising speed. $2500. W. C. Norris, Fruithurst Drive, Pittsburgh 16, Pa. Lo 3481.

CULVER LCA NC37825, Cont. 75 HP just majored with new pistons, crankshaft, cylinders, etc., installed. Aircraft in perfect condition. Finished green and yellow. $2495.00. Abilene Aviation School, Municipal Airport, Highway 80, Abilene, Texas.

1942 CULVER LFA, 300 hours total time. Two-way radio, landing lights, navigation lights, handrubbed finish, always hangared, excellent condition. $2750.00. J. J. Lehman, Box 903, Oklahoma City, Okla.

DART

DART, Warner 90 h.p. 30 hours since major, ship no hours since complete rebuilding, complete recover, hand rubbed, black and red. Lifetime windshields, new hatch. Starter, generator, new battery, running lights, dual brakes, dual throttles. F. R. Schreiter, 140 Brook Street, Clinton, Mass.

DART Model G, 90 Lambert. 75 hrs. since 100 hr. major. Aircraft and engine in excellent condition. Side by side plane. Cruises 105. Over 400 mile range, 4½ gal. an hour. New RCA receiver, Hamilton steel prop., sensitive altimeter, brakes, heater, plus standard flight instruments. Excellent for cross country or acrobatics. Selling at a real sacrifice for $2100.00. R. H. Wehr, M.D., Covington, Ohio, Phone 201.

ERCOUPE

1946 ERCOUPE 75 h.p. Continental Engine. Only 28 Hours on the Airplane and Engine. $3100.00. Standard Air Service, Glen Burnie, Md.

ERCOUPE—65 HP with RCA two way radio, navigation lights, and special paint job. This ship has always been privately owned by one particular person and with less than 250 total hours is in perfect condition thruout. $3,050.00. Reading Aviation Service, P. O. Box 1201, Reading, Pa.

FAIRCHILD

FAIRCHILD 24-G Four Place, Warner 145. Total time 1592 hours, engine since factory major 252. Recertificated 5/29/46. 2:30 since periodic. Completely refinished, six coats Fairchild blue and yellow. Brand new Goodyear six-ply tires. Certificated for instrument flight. Grimes landing lights, three flares, RCA transmitter, two receivers, trailing, fixed, and whip antennas. Ship hangared continually and in excellent condition. $6800.00. John Carleton, 6500 Montgomery, Cincinnati, Ohio.

FAIRCHILD 24G 150 hours on factory, rebuilt engine. Complete blind flight instruments. 2-way radio. Only $4470.00. Wm. Perry, Mott, No. Dak.

1942 FAIRCHILD PT19, 175 h.p. Ranger Engine. 340 Hours on Engine Since Major Overhaul. Plywood Wings Refinished May 1946. Fabric on Fuselage in Good Condition. Relicensed April 1946. $1145.00. Standard Air Service, Glen Burnie, Md.

FAIRCHILD M62A, 3 hours since top overhaul, new two-tone green paint job. $1595. Niederhauser Airways, Marshalltown, Iowa.

FAIRCHILD 24C8E. Forty hours since major. Splined shaft, oil radiator, starter and generator. Complete complement of shock mounted instruments including horizon and directional gyro. Receiver, transmitter, parachute seats, flaps, flares, lights, etc. Very clean, $4600.00. J. S. Tuttle, 1234 Willow Lane, Birmingham, Mich.

LICENSED PT 23 in excellent condition. Only 35 hours on engine and aircraft. Electric intercom, $2500.00. Richard Chastain, Emerson, Iowa.

HOWARD

HOWARD DGA-9, total hours 888, no time since factory major, Jacobs L-5 late type heavy duty crankshaft, Ham. Two-position prop., with nose spinner. Licensed for instruments, cruise 145, gas capacity 137 gals. Airplane completely rebuilt April 1946. New radios, new tries, Color yellow, blue trim. Gas Consumption 13 gals per hour. Central Aircraft, Route 6, Little Ferry, N. J. Hackensack 3-9721.

INTERSTATE

INTERSTATE Cadet NC37427. Cont. 65 HP. 57:05 since engine major. 1226:55 total on aircraft. Finished red with wellow trim. Sacrifice $1395.00. Abilene Aviation School, Municipal Airport, Highway 80, Abilene, Texas.

LUSCOMBE

LUSCOMBE 8A, NC25280; 65 h.p. Continental motor, new fuel injector. Steerable tailwheel, cabin heater. 40 hours since topped, 275 since majored. Excellent condition throughout; flies perfectly. $1800 gets it. Hiram Sloan, Dalhart, Texas.

LUSCOMBE 8A; NC45515. Made January 26, 1946. In perfect shape, including sensitive alt., RofC, T&B, aerial and Airboy receiver, compensated compass. 4° total deviation. Total hours 68:10. All cross country. Only reason for selling, have ordered Seabee. Will deliver. Price $2995. George L. Johnson, 718 7th St., Parkersburg, W. Va.

WE HAVE a limited number of Luscombes with 65 horsepower Continental and Lycoming engines left. No time since 100 hour inspection. All in excellent condition. Priced for immediate sale. Call, write or wire: Bowen Flying Service, West Memphis, Ark. Phone 390.

NEW 1946 Luscombe side by side all metal Silveraire, 1 hr. since purchased new. Price $2995.00. Wire. K. B. Kenner, Rogersville, Tenn.

NAVY

N3N, $950. NC44985, perfect condition, exceptionally good flyer, low hours. Wire money to hold. John Creehan, Walnut Street, Demopolis, Alabama.

PERFECT condition Navy N3N. Only 10 hours since licensing and 100 hr. check. $1195. John F. Creehan, Demopolis Air Service, Demopolis, Alabama.

NOORDUYN

4 NOORDUYN Norseman. Three with around 300 hours since new. One with around 400 hours since new. All NC'd, good fabric, complete instruments and radio. Three with radio compass installed and other compass available for installation. $13,000.00 each! Sacrifice sale! Write today to Box No. 407, c/o Flying.

NORSEMAN. Newly licensed for 8 or cargo. Refinished beautiful maroon and cream. All new interior. Airline seat arrangement. All instruments. Low time. American Typewriter Co., 116 S. 7th St., Minneapolis, Minn.

NORTH AMERICAN

NORTH AMERICAN SNJ-3 (AT6) fully licensed for day, nite, and instrument with full set gyros in both cockpits and clock up front. Radio converted. Polished aluminum with red trim. New tires. Will cruise 197 true air speed. Aircraft total 1627 hours with 11.6 hours since major overhaul. Engine total 1571 hours with 20 hours since major overhaul. Positively looks like new inside and out. $2995.75. First $300.00 deposit gets it. Hoffer's Flying Service, Woodward Field, Camden, South Carolina.

AT-6A, CAA Licensed. 241 hours since Major Overhaul. Good Clean Condition. $3000. John C. McGee, 6156 Walnut St., Philadelphia 39, Pa.

PIPER

1946 J3C PIPER with 50 total hours. Will trade or sell for $2000. Always in hangar. Cyrus Sorge, 97 Arden St., New York, N. Y.

CUB J3L 65 h.p. 1700 total time. New tires, shock cords, plexiglass windshield, valves ground, new gaskets. Recovered in '44. Excellent condition, price $1495.00. Willard A. Zehr, Carthage Airport, Carthage, N. Y.

PIPER J4 1940 C65. Engine majored 90 hrs. ago. Total time 600. Entire airplane recovered with grade A fabric this month. Two tone finish. Extra tank, turn and bank, lifetime windshield, and pants. Never cracked. Sacrifice at $2195.00 Hangared. P. W. Tyree, Altavista, Va.

PIPER CUB J-3F-65. Excellent condition, fresh periodic, fly-away for $1250. Piper J-3F50, exceptionally clean, good performer, fresh periodic, fly-away $1025. Piper Cruiser J-5C75, only 1000 hours, flies fine; price $1700. Call, wire or come to Ravenswood Airport, P. O. Box 69, Des Plaines, Illinois. Phone: Des Plaines 67.

1941 PIPER Coupe, Continental 75, 150 hours since complete factory engine major, also aircraft. Two-way RCA radio, lights, wheel pants, maroon finish, generator, full swivel tail wheel, extra propeller. Always hangared, never cracked. Aircraft in excellent condition. $2400. Robert Welsh, 340 E. 5th, Gary, Indiana.

PIPER CUB Coupe — 1941 — J-4-E NC37993—Contimetal 75 H.P. 520 hrs. total time. Complete set of blind instruments, clock, R.C.A. Transmitter, R.C.A. Receiver, and loop, New Prop. Price $2400.00. Logansport Flying Service, Logansport, Indiana.

1945 J-3 PIPER CUB—65 hrs. total time on ship and engine. Hydraulic brakes. Scott Steerable Tailwheel. New Condition—$1875.00 or will trade for Luscombe or similar cross-country ship. Also have three seat type parachutes in perfect condition—$50.00 each. Copper Basin Flying Service, Ducktown, Tennessee.

CUB COUPE J4F L-65. 1941. Red and yellow. 800 hours. 75 hours since complete ($850) plane and engine overhaul. New paint, prop., tires, tubes, pyrolin. Location Dayton, Ohio. $1900.00. Box 308, Hempstead, N. Y.

CUB J3 40 hp. 75 hrs. since covered, and engine majored. $100.00 will hold. $750.00. New Prop. and Windshield. Bragg Flying Service. Georgetown Municipal Airport, Georgetown, S. C.

FOUR CUB J3—Lycoming, Continental, Franklin 65's. Yearly inspection just completed. $1400.00 each. Lexington Flying Service, Inc., Lexington, Kentucky.

PIPER trainer, J3-C-65, no time since brand new motor. Better than new. Alton Walker Aircraft Sales, Box 225, Monterey, Calif.

PIPER J3F60, good condition. Low engine time since major, $1,400.00. Bill Ash, 931 Lafayette Ave., Union, N. J.

NORSEMAN

LICENSED 1944 Norseman 173 hours since major. New tires, propeller spinner. Airplane still retains original factory appearance and markings. Fabric like new. Complete instruments and radio. Licensed for 9-place or cargo. Floats can be readily installed. Price $14,500.00. W. Serhus, 1644-21 N.W., Washington, D. C.

PORTERFIELD

PORTERFIELD LP65. NC37870. Lycoming 65 HP. with 113:55 since major. Total 2594:05 on airplane. No time since periodic. All Bulletins Complied with. Finished red with cream trim. $1495.00. Abilene Aviation School, Municipal Airport, Highway 80, Abilene, Texas.

REARWIN

REARWIN Cloudster, 3-place 120 H.P. Cruises 125 on 7 gallons. Starter, transmitter, receiver, direction finder, full instruments, landing lite. Very clean, low time, always hangared. Cost $6600. New, will sacrifice. Will demonstrate anywhere. Leon Levitz, 212 High St., Pottstown, Pa. Phone 2620.

RYAN

RYAN ST3KR160 NC54014. Engine 130 hours since new. Excellent condition throughout. F. R. Keen, General Delivery, Enid, Oklahoma. Ph. 5135M.

1943 RYAN P.T. 22 165 h.p. Kinner R-55 engine. 165 hrs. on engine since major overhaul. Now being completely recovered with grade A fabric, and all C.A.A. Bulletins complied with. Our price of $1995.00 includes completion of overhaul and relicensing. Standard Air Service, Glen Burnie, Md.

STEARMAN

STEARMAN, very clean inside and out. Vermilion with black and white finish. Choice of either wood or metal propeller. Engine and entire ship in good condition. Price $1695. Samuel C. Rial, Box 133, McGehee, Arkansas.

STEARMAN NC51854, hand picked from first surplus, engine 250 hours, since major, factory reconditioned steel prop., complete plane in perfect condition, selling to buy larger ship, $1795.00. H. Francis, 47 Roselyn Dr., Pittsfield, Mass.

STEARMAN NC61426 just licensed Cont. 220, 190 hrs. since navy rebuilt. Very clean throughout. Fabric excellent with beautiful red finish. Price $1690.00. Joe Dubbe, Red Wing, Minn.

STEARMAN NC53169, 675 total hours, 20 hours since licensed, 220 Cont. engine, very clean, metal prop., turn and climb indicator rear cockpit, excellent silver fabric, engine covers included, may be flown if interested. Priced right, terms cash. Earl Whalen, RFD 2, Hemet, Calif. Ph. 4811.

STEARMAN PT17 license April, 46. 90 hrs. on engine since overhauled. Always hangared. $1000.00. $100.00 will hold. Bragg Flying Service, Georgetown Municipal Airport, Georgetown, S. C.

STINSON

STINSON 105, maroon, 460 hours on aircraft and engine, electric starter, generator, pants, rate of climb, ball bank, sensitive altimeter and airspeed. Always privately owned, excellent condition. $3000.00. Lexington Flying Service, Cool Meadow Airport, Lexington, Kentucky.

STINSON 105, yellow, black trim, 1210 total hours. 10 hours since major and yearly inspection. Landing lights, flares, generator, fabric good. $2600.00. Lexington Flying Service, Cool Meadow Airport, Lexington, Kentucky.

STINSON SR7-B being licensed for night and day instrument. Engine since major no hours, Lycoming 245 h.p., Ham. Standard prop. Total airplane hours 300. Color black fuselage, orange wings. Wheel pants. Price for quick sale as soon as completed $5950.00. Central Aircraft, Route 6, Little Ferry, N. J. Hackensack 3-9721.

STINSON SR9EM, new cover and major on 350 HP Wright engine and constant speed propellor. Sound proofed; hand rubbed. RCA radio compass, 20 watt transmitter. Perfect condition. Wichita Falls Air Transport Company, Box 809, Wichita Falls, Texas. Phone 6510.

BARGAIN. SR5B-A-1 shape. 160 hours since major. Equipped day-nite instrument. Wire deposit to hold. Clinch Flying Service, North Platte, Nebr.

STINSON SR-5-E. Nicest one in country. Must see to appreciate. Privately owned, flown by only two pilots. Always hangared and kept waxed. Looks almost new. Never damaged, 900 hrs. total. Engine factory majored. Airplane, engine, perfect. New tires and battery. Transmitter and receiver. Ideal ship for executive or operator. Accept good late model light ship or automobile in trade. Carl B. Woodford, Weston, W. Va. Phone 650.

STINSON 10, three place, new engine, Continental 80. Equipped with two way Lear radio, landing lights, navigation lights, turn and bank, rate of climb, sensitive altimeter, cylinder head temperature gauge. Electric starter, heater and wheel pants. New paint job. Cash $3500. A very clean airplane. Write or phone. Clinton S. Knettel, 35 Williams St., Farmingdale, Long Island, N. Y. Phone 1460.

STINSON 105—80 Continental, no time since major. Total time 1142. Landing lights, flares, radio, $2800.00. Lexington Flying Service, Inc., Lexington, Ky.

TAYLORCRAFT

TAYLORCRAFT Deluxe, 1946 model, $2650.00. 55 total hours, wheel pants, receiving radio, sensitive altimeter, navigation lights, cream white wings and blue fuselage. M. L. Parrish, Marlin, Texas.

TAYLORCRAFT BL-65, Side By Side. Cabin heat, brakes, new lifetime windshield. Finished in blue and yellow. $1300.00. N. H. Mingledorff, Box 3197, Savannah, Georgia. Phone 23075.

TAYLORCRAFT Tandem 65 h.p. 420 hrs. total. Plane, engine like new, $1500. Aeronca TL less eng. damaged wing, bent tail, $500. W. R. Goddard, Municipal Airport, Ardmore, Okla.

NEW 1946 Model BC 12D Taylorcraft, no time on ship or motor. Will sacrifice at $2290.00. H. L. Weaver, 6035 Wyandotte, Kansas City, Mo.

TAYLORCRAFT DCO65. 1943. 205 hrs. on new C65 engine. Brakes, muffler, new propeller. Licensed. $1320. American Aircraft Corp., Municipal Airport, Knoxville, Tenn., P. O. Box 1509. Phone 2-4286.

NEW 1946 Taylorcraft for sale. Price $2550.00. Elmo Meiners, Anchor, Illinois.

1941 TAYLORCRAFT Deluxe Coupe 65 h.p. Lycoming engine. 200 hours on engine since major overhaul. Wings recovered May 1946. Beautiful interior. Airplane in very good condition. Relicensed May 1946. An especially good buy at $1895.00. Standard Air Service, Glen Burnie, Md.

TAYLORCRAFT L-2-M—Licensed. Only 490 total time. Engine just topped and 100-hour just completed. $1395.00. Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas.

1940 TAYLORCRAFT BL65 DeLuxe, 250 hours since major. $1600.00. Brand new 1946 Taylorcraft immediate delivery. New 1946 Cub J3 Cont. 65. 1946 Cub J3 Demonstrator. Greenville Flying Service, Greenville, Michigan. Phone 509J.

NEW 1946 Taylorcraft BC-12-D. Standard model. Continental 65. Ferry time only. 24 Gallons Gasoline capacity. Radio Receiver. Hangared. Must sell because hangar space. John D. Carr, P. O. Box 309, Phone 642-M, Carlsbad, New Mexico.

TAYLORCRAFT L2B, red and white. Good fabric, pyralin, tires, and prop. $1200. Niederhauser Airways, Marshalltown, Iowa.

TIMM

TIMM N2T-1: NC57901. 387 hrs. total time plane and motor. Just licensed, painted. Perfect shape. The outstanding buy in PT class. Cruise 115 knots. PT-19A-NC58332 51 hours since major. Beautiful orange and black. Roger Pennock, Medford, N. J.

VULTEE

BT 13B—1944—NC60252. Full set of instruments in both cockpits. Plane just refinished. 680 hrs. on plane and engine. Radio and plane licensed. Price $1995.00. William Trask, 366 Commerce St., Corning, New York.

VULTEE BT13A. Three to choose from. All low engine time. Refinished inside. Outside polished. Excellent condition. Take your pick for $1500.00 each. Abilene Aviation School, Municipal Airport, Highway 80, Abilene, Texas.

VULTEE BT-13 and SNV Owners Attention: We have surplus Vultee Valiant parts for sale, including good Wasp, Jr., engines. We also license Vultee Valiants at low cost. We have expert A&E mechanics and complete equipment. We are distributors for Stinson Division, Consolidated Vultee. Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas.

VULTEE Valiant. Licensed with only 60 hours since Navy major. Complete instruments both cockpits. Only $1395.00. Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas.

VULTEE BT13—Two way radio. Licensed day and night instrument Airline quality equipment thruout. Cruise 150 at 5000 $2150 or best offer. A. Rudy Hruska Aircraft, 117 No. 7th St., St. Louis, Mo.

VULTEE Valiant SNV-1 (Same as BT-13A). Licensed, ready to go. 48 hours since major on engine. Complete instruments. Both cockpits including Sperry gyros. Radio that works. Painted bright red with white trim. A steal at $1495.00. Arkansas Aviation Service, Inc., Grider Field, Pine Bluff, Arkansas.

WACO

WACO ZQC-7 Custom. Airplane being refinished, and licensed for night and day instrument flying. Color red with black trim. Jacobs 285 h.p. wheel pants. Time since engine major 30 hours, since recovering and overhauled none. Priced right. Central Aircraft, Route 6, Little Ferry, N. J. Hackensack 3-9721.

WACO RNF 125 Warner. 170 hours since $1700.00 factory modernization. Aircraft completely recovered, new spars, new center section and new wing fittings. Three place. Excellent for passenger hop. $1700. Lexington Flying Service, Inc., Lexington, Kentucky.

WACO RNF, three-place, Warner 125. No time since reconditioning, covering in fine shape, color Waco green and yellow, $1550 cash. No trades. R. V. Green, R.D. No. 1, Fulton, N. Y.

WACO-UPF-7, licensed, good condition, battery, $1300.00. Terms. Wm. Adams, 1025 Park Ave., Plainfield, N. J.

WACO YOC 225 Jacobs, many extras. $5000. '41 Culver LFA NC41636, 65 hours since major, $2400. '43 Fairchild PT 19, $2000. Les Kahl, 1422 S. 6th Ave., Tucson, Ariz. Phone 7440.

WACO YKS-7. 1937 Model 225 Jacobs. Total time engine and airplane thirteen hundred. Engine majored fifteen hours back. Upper wings and tail recovered. Recently reupholstered. New 46 model two way Airadio. Blind primary group instruments. Curtis Reed propeller. Just re-licensed for five. Useful load twelve hundred. Baggage one hundred. Cruises one twenty with safe 4½ hour range. In and out of small fields like a cub. Good high altitude performer. Blue fuselage and trim with wings cream. The new four place planes can't touch this one for utility and performance. Price $5950. San Marcos Flying Service, P.O. Box 51, San Marcos, Calif.

MISCELLANEOUS

SAILPLANE — For sale. Pratt-Read. Two place side by side, complete with trailer. Licensed. Less than two hours flight time. $850.00. Cannot study and fly too. Robert W. Barr, Proffit, Albemarle County, Va.

PIPER Cub $550, Aeronca $850. Many bargains like these every month. Send 25c for latest listings of used aeroplanes engines, and equipment located all over the country. "Sky-Pilot." P.O. Box 3197 Savannah, Georgia.

AIRPLANES—Used—Bargains at give-away prices. Many licensed and flying. Don't buy that airplane or equipment until you have seen our latest directory. You may save yourself a fortune. Send 25 cents to cover mailing. Aero-Trader, CP, Adams, Mass.

AIRPLANES WANTED

WANTED to buy for cash damaged Aeroncas, Cubs, Taylorcrafts, for parts, also salvage and surplus parts. Houseman Aircraft Parts, Wayland, Michigan. Phone 3507.

WANTED: Corben, Heath, Knight Twister, or other similar ship. Parts or assembled. State price. F. Cahill, 1719½ Detroit Ave., Toledo 7, Ohio.

WANTED: Arrow Sport V-8 in good condition. Write giving total time on plane and engine. Capt. Raymond W. Schlachter, 101 Hiltonia Park, Lexington, Kentucky.

CURTISS Robin, any condition. Completely describe, quote lowest price in first letter. Must be bargain. Norman Doyle, Rt. 1, Box 258-A, Mt. View, California.

ANY ECONOMICAL Aircraft in full or partial exchange for toy railroad triple-switch patent 2,214,310. Those individuals or concerns interested write Robert Schreffler, Philipsburg, Pa.

EAGLEROCK. Prefer Challenger. Must be in good condition and licensed for full gross load—no junk. Give complete details, photograph if available, all hours, fabric condition and price flyaway at base. Write. Lloyd Hoskins, General Delivery, Caliente, Nevada.

PARTS AND ACCESSORIES

3 AERONCAS—Model-K for parts, fuselages, wings, tail surfaces, wing struts, landing gears, good motors, single ignition, and motor part. Houseman Aircraft Parts, Wayland, Mich. Phone 3507.

BEST offer any or all: Bendix magnetic compass; Bendix MN26Y radio compass including remote control box and course indicator; blind flight group including turn and bank, rate of climb, artificial horizon, gyro compass. Also Franklin 6ACT—298-J5 (150 hp) minus mags and manifolds. Raymond Musick, Rt. 2, Eugene, Oregon.

FOR SALE: Airplane dual seal tubes 19.00 each $7.25; 23.00 each $8.75; 26.00 each $10.25; also Heath B-4-30 h.p. engine $45.00. Albert Exline, R. R. 2, Miamisburg 3, Ohio.

NORSEMAN Spare Parts: Ten slightly worn tires and tubes. Four main landing wheels. Six tail wheel tires and tubes. Five tail wheels. Eight new aircraft batteries. All for $725.00. One radio compass assembly with inverter for $400.00. Box 402, c/o FLYING.

FAN MARKER Receivers, brand new in the original cartons. Complete with all accessories, ready for installation. Instructions included. Order now, limited supply. $65.00. Weight 2½ lbs. Specify 12 or 24 volt. Southern Skyways, Municipal Airport, Houston 12, Texas.

ONE Stinson Voyager Motor. No time since major. Accept trades. Instruments and two-way radio. Bluegrass Airlines, Bowling Green, Ky.

NEW airplane tires 8 ply 30" for Norseman $49.95; 8:50 x 10 6 ply for Waco, Cessna, Beech $28.20; 6:00 x 6 4 ply $18.55; one piece plexiglass windshield $34.50 Hartzell propellers $35.00. Finest quality sun glasses with case $7.50. A complete line of aircraft accessories. Airport operators write on letterhead for special discounts. Sky Supply, Inc., Washington National Airport, Washington, D. C.

TIRES New Post War—Goodyear—Firsts—Fresh stock at lowest prices ever. Every size stocked. We are the biggest supplier of tires in the country. Satisfaction guaranteed or we refund. Lowest prices. Immediate deliveries. Fabric. Dope. Bolts. Sensenich propellers. B. G. & Champion spark plugs, storage batteries. Shockcord rings. Windshields, instruments, Scott tailwheel assemblies. Bob Trader Aero Supply, 929 Penn Ave., Pittsburgh, Pa.

STEARMAN PT new 27.50 x 8.90 tires $14.00, used $5.00, new 10.00 tail $5.00, used $2.00. Marvin A. Northrop, 500 N. Washington Ave., Minneapolis, Minn.

ATTENTION aircraft owners and operators. Don't take a chance on having your airplane grounded while locating needed parts. The Aero Parts Directory shows the location, in the United States, of hundreds of parts and accessories for many makes and models of airplanes and engines. Price $1.10 postpaid. Aero Parts Directory, Box 2739, Cleveland 11, Ohio.

NEW SET of Edo Float struts to fit Aeronca Chief. Price $75.00. Norway Flying Service, Norway, Me.

RING cowl for Fairchild 24-Rocker Box, —recess type $65.00. Also Warner and Ranger engine parts. United Aero Service, Inc., P. O. Box 1028, Delta Air Base, Charlotte, N. C.

NEW PROPELLERS — PT-19, $31.50. Beechcraft and Cessna, Constant Speed, $656.25. Parts for: Cessna, Beechcraft, PT-19, Taylorcraft L-3, Stinson Reliant and Voyager. All models Aeronca. United Aero Service, Inc., P. O. Box 1028, Delta Air Base, Charlotte, N. C.

CONTINENTAL 50 hp engine, bought new from factory, never used, $350.00. Lawrence Allison, 632 North 7th, Lawrence, Kansas.

WACO Taper Wing needs, recovering $200.00 crated. Parts for UPF-7. Houseman Aircraft Parts, Wayland, Mich.

CESSNA (Parts, supplies, etc.). Batteries, 24 volt Exide for UC78, $15.00. Also 12 volt Exide for BT-13, many others. Write H&H Aircraft, Lambert Field, Mo.

AIRCRAFT wire, type 16-18-20-22. in rolls of 500' or more. $.50 per 100 ft. Lyell Hdw. & Lumb. Co., Inc., 1451 Lyell Ave., Rochester, N. Y.

DELCO motors No. 5069625—Aircraft 27 V. D. C. 120 R.P.M. made for Air Corps, brand new $4.50 each. Lyell Hdw. & Lumb. Co., Inc., 1451 Lyell Ave., Rochester, N. Y.

PT-19 PARTS. Six ships disassembled, immediate delivery. Memphis Flying Service, Inc., Box 166, Memphis, Tenn.

USED light planes, Engines, Parts: Cubs, Aeroncas. Low prices. Lists dime. Opalack, 1143 Cherry, Pottstown, Penn.

BUY with confidence. Our large stock of 22,000 separate items assures you of prompt shipment. We are wholesale stocking distributors for leading manufacturers. Dealers send for our 50 page wholesale catalog listing everything from pilot supplies to sheet steel and aircraft lumber. Meltz Aircraft, Inc., New Brunswick, New Jersey.

AVIATION EQUIPMENT

PRE-WINTER Bargains! Leather-rubber soled, sherling lined flying boots, good condition, slightly used, $4.95 pair. Brand new Army A-11 pure leather headphone type helmets, suede lined, adjustable size type, $4.95. Brand new Army B-6 leather helmet, sherling lined, visor, conventional type, $4.95. Brand new A-9 O.D. serge helmet, sherling ear muffs & chin strap, $1.50. Combination visored long bill cap and helmet, khaki covers neck & ears too, $1.85. Winter flying cap, Bart's B-4, 100% pure Army wool, unbreakable visor, dry cleanable, $1.65. Winter Flying pants, Army A-10, O.D. water repellent, heavy sherling lined, seven large pockets, heavy duty suspenders; not heavy like leather type. You have a jacket; buy a pair these pants. you have a complete suit! Only $9.95. State size. Brand new Army AN6530 clear lense, soft rubber face mask goggles, $5.95, used, $3.95. Avoid scarcity of winter flying equipment by ordering now; discounts for quantity. Aero Parts Supply, Municipal Airport, Houston, Texas.

A2 FLIGHT Jackets, Army type, dark brown horsehide leather, cloth lined, zippered, knit waistband and cuffs $18.75 or Goatskin leather $21.75. Navy Pilot Summer Jackets, tan poplin, free action back, unlined, zippered, $8.00. Nationally known "Sun Dodger" Cap, khaki or olive drab twill, long visor, $1.15. Helmets—All A.A.F. Goatskin leather intermediate helmet with sponge rubber ear cups, $3.45. Mae West Life Jackets, $4.00, Cartridges 25c each. Life Rafts—One man $25.00, Five men $50.00, Seven men $70.00. Other items. Flying Equipment Sales Co., 1641-3 W. Wolfram St., Chicago 13, Ill.

SURPLUS computers, good condition, less carrying case; E6B computers, plastic $6.00, metal $7.00. Weems Aircraft Plotters, Mark II, $1.00. "Aeronaut Sales," 1006 N. Jefferson, San Angelo, Texas.

SUNGLASSES—Army, Navy type flying glasses. Raybar green lenses, same as used by armed forces, 14 KT gold plated large face form frame, with pearl brow rest. Complete with case, direct from maker. Sold on money back guarantee. $3.95 (sent prepaid). Enclose check or money order. Ron Sales, 516 Jerome St., Brooklyn 7, N. Y.

BARGAINS — New Headset Extension Cords—6 foot length—$1.50 each. Brand New Headsets—Type P-23–High Impedance—Large Sponge Rubber Ear-cushions—4 foot cord, requires no extension—$3.50 each. Hand Microphones—Type T-17—Rugged—Excellent Quality—$4.00 each. Aircraft Communications Company, Derby, Connecticut.

USED Weems Plotters. Scratched, but not cracked or bent. 75¢ postpaid. Send stamps or coin. Southwest Supply Co., P. O. Box 297, Sanderson, Texas.

NEW AAF B-7 goggles. Choice of clear, green, amber ground glass lenses, $6.25. Used AAF A-13 Navigation Master Watches, $57.50. New AAF B-8 goggle kits. Contains goggles and eight extra plastic lenses in clear, green, amber; $1.00. Southwest Supply Co., P. O. Box 297, Sanderson, Texas.

NEW A-2 AAF regulation type jackets in genuine horsehide, $18.75 in all sizes. New K-1 summer flying suits in all sizes including large in the finest Byrd cloth with 9 zipper pockets and Army Air Corps insignia on each garment now available to civilians, $9.50. New L-1 flying suits in wool gabardine with 9 zipper pockets, $12.50. R.A.F. Sundodgers, the most popular summer flying cap, with long visors, $1.15. Names engraved in gold on leather strip with wings to be sewn on jackets for only 75¢. R.A.F. Sales Company, for finest in sportswear, 509 So. Franklin Street, Chicago, Illinois. We welcome dealers and distributors on all our merchandise. Send for latest catalog.

NEW Parker 51 Pen & Pencil sets, $17.50 each, no Fed. Tax. R.A.F. Aero-Plane sun glasses, 12 Kt. pink gold filled frame with sweatbar, ground and polished dropped lenses. Regular $12.95 value now $7.50 including case. For the biggest line in watches, such as Chronographs, and Chronodates, send for catalog. We welcome dealers and distributors at attractive discounts. R.A.F. Aviation Sales & Supply Co., 509 So. Franklin St., Chicago, Illinois.

SUMMER Flying Suits, Air Corps issue tan Byrd Cloth, zipper front, sizes 36-40, $9.75; Army shirts, all wool worsted, all sizes, $5.75. Satisfaction guaranteed. New York Clothing Co., Dept. FL, 2079 Second Ave., New York 29, N. Y.

SUNGLASSES, Air Corps style, ground and polished lenses. Sweatbar, yellow gold-filled frame. $12.00 value for $8.00. Star Optical, Box 326, Butler, Pa.

REGULATION Army type flying helmets, made of brown leather, completely chamois lined, with soft ear pads. Come equipped with gosports and removable earphones. Sizes—small, medium, large. Price $6.90. Postage prepaid. F. A. McMillan, 417 No. Delaware St., San Mateo, Calif.

COORDINATE Azimuth Ring for E6B: Streamline your E6B: nothing new to learn; same results with fewer settings—save time—save errors; fewer markings necessary; wind vector can be read directly without rotating ring, moving slide, marking face; fits all plastic E6B Computers; single-drift solution for wind and groundspeed with the use of the bomb-sight. Price $1.00 with instructions; E6B Computer, plastic, $10.00; Cox & Stevens Computer, $35.00; Universal Plotter, $3.75; American Airline Computer, new type C, $5.00; price list showing all types navigational equipment sent upon request. Carrow Navigation Service, 2510F Oakdale, Houston 4, Texas.

U.S. ARMY Air Force "Mae West" Life Preservers. Surplus Stock, brand new with cartridges included, $12.00. Schofield's Flying Equipment, East Weymouth, Mass.

ARMY Air Force Type D-4 Fluorescent Computer now available, $2.00; Mark II (Weems) Navigation Plotter, $2.00; Dalton Navigational Computer with book of instructions, $5.00; New Type "C" American Airlines in fine leather case with instructions, $5.00; E-6B Army Type Navigational Computer with leather case and instructions, $10.00; Link (Bubble Type) Sextant in carrying case, $230; Aviation Sun Glasses, $12.00. Dealers; new catalog now ready—Write for agency. Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood, Calif.

U.S. ARMY Air Corps A-2 Leather Jackets. Limited supply. Price $17.95 (New, Government Surplus). Army Air Corps Style Bombardier Caps, fur lined with long visor. Price $2.50. Schofield's Flying Equipment, Commercial Square, East Weymouth 89, Mass.

U.S. NAVY all zippered birdcloth Summer Flying Suits, $14.95. Also Nylons in size 42 only. Price, $25.00. Schofield's Flying Equipment, East Weymouth, Mass.

NEW: Engine Performance Calculator for P&W R-1830 Engines; determines BMEP and BHP readings; enables flight crewman to obtain engine performance without the aid of graphs and complicated mathematical calculations; calculates air temperature corrections, density altitude corrections and various conversions necessary in flight—$10.00 with instructions and case. Also DeVries Navigation Calculator: Works problems faster and accurately; setting the true course, Magnetic Variation, Deviation and Wind Drift Angle, all answers of dead reckoning given immediately, Magnetic Course, Compass Course; Compass Reading, Magnetic Heading and True Heading; also calculates at one reading all other navigational problems—$10.00 with instructions and case. Carrow Navigation Service, 2510F Oakdale, Houston 4, Texas.

KING Position Computer computes and plots Radio Compass Bearings; multiple station fixes; converts true headings to magnetic headings and vice versa; provides reciprocal and perpendicular bearings; makes all calculations incident to radio compass navigation; visual aid in teaching radio direction finding when used with Link Trainer; $3.50 with instructions and case. X-C Cross Country Computer, a dead reckoning computer with log sheet, leg straps and pencil holder; determines ground speed; flying time required; distance flown; fuel consumption; calibrates true air speed and true altitude; you need only an X-C and map in a plane. $4.00 with instructions. Carrow Navigation Service, 2510F Oakdale, Houston 4, Texas.

GOODRICH tires, Dupont Pyralin, Lucite, Hetrick shock rings, shock cord and wind shield covers, Eastman instruments, Kane bushings, Titanine dope, thinner, Pigmented dope, lacquers, enamels, synthetics all colors in stock for prompt shipment. Meltz Aircraft Inc., New Brunswick, N. J.

PLYWOOD, spruce, cap-stripping, sheet steel, tubing Aircraft hardware, Goodrich tires, pyralin, propellers. We are stocking distributors for leading Manufactures. Open-account shipments to established operators. Meltz Aircraft Inc. New Brunswick, N J

BOOKS

AIRCRAFT and Engine Mechanic Manual—just off the press—contains typical new examinations. Prepare for your rating. Only $3.00, postpaid or C.O.D. Quiz System, 12021 Ventura Blvd., N Hollywood, Calif

C.A.A. EXAMINERS and Flight Instructor applicants: Fortify yourself with Flight Instructor by Zweng. The only text available showing methods of grading the various flight maneuvers. Typical "Multiple Choice Flight Instructors" examinations in the appendix. Only $3.00 postpaid or C.O.D. Pan American Navigation Service, 12021 Ventura Blvd., N Hollywood, Calif. (Free Folder)

METEOROLOGY and Methods of teaching enlarged and fully covered in "Ground Instructor" basic text $3.00 and "Ground Instructor Rating" (tune up manual for the examinations) containing important new material and typical "Multiple Choice Examinations" all subjects, $3.00 or both for $5.00 postpaid or C.O.D. Pan American Navigation Service, 12021 Ventura Blvd., N Hollywood Calif

AIRLINE Transport Pilot Rating, by Zweng; a new book, first of its kind—prepares applicants for Airline Transport Pilot Rating. Typical Examinations included. $4.00 postpaid or C.O.D. Pan American Navigation Service, Dept. F-C, 12021 Ventura Blvd., N. Hollywood, Calif.

METEOROLOGY for Airmen by Charles A. Zweng (just published). Especially written for pilots. New and different, fully illustrated. Prepares for any rating in Meteorology. Essential for the Ground Instructor. Latest "Multiple Choice Examinations." Remember that "weather" is your greatest hazard. Price only $3.00 C.O.D. or postpaid. Pan American Navigation Service, 12021 Ventura Blvd. N. Hollywood, Calif.

NEW RATINGS—Can you pass the new CAA examinations? Can you define: Compression ratio—Relative bearing—Isentropic chart—Moment Arm—SBRA? These and thousands of pertinent questions are covered in the New DeLuxe Aviation Dictionary, by Charles A. Zweng. A "must book" for every airman and Ground Instructor. Limited First Edition now ready. $6.00 postpaid, or C.O.D. Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood, Calif.

AVIATION Dictionary by Charles A. Zweng—listed in the Journal of Education as an outstanding book—needed by every airman—saves headaches on examinations. Only $6.00 postpaid. Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood, California.

1946 PILOTS' Pocket Information File—144-page pocket size directory giving latest available information on 1272 airports in the 13 Western states including location, physical data and local attractions. Contains radio range data, airways facilities chart, C.A.R. condensed, lightplane specifications and performance data, etc., $1.00, postpaid. Occidental Publishing Co., Dept. F, 304 South Broadway, Los Angeles 13, California.

SKYWRITING—plans for making the equipment and how to use it, complete 70-page book only $2. Aircraft Directory, Athens, Ohio.

AERIAL Photography—How to build the cameras, how to take and sell the pictures, complete 70-page book only $2. Aircraft Directory, Athens, Ohio.

ESTABLISH your own profitable flight operation! "Operating a Flying Club" tells you how to start on a shoestring; how to expand; get business; valuable operational tips, trade secrets. Author formerly with CAA. Only $1.00, postpaid. Satisfaction guaranteed. Merritt Wells Pub. Co., Warwick 1, N. Y.

MILITARY Pilots! The CAA has made it very easy for you to obtain your civil license and ratings. The "Pilot's C.A.R. Primer" contains all the facts you need. Only 75c, postpaid. Merritt Wells Pub. Co., Warwick 1, N. Y.

STUDENTS — Pilots — Mechanics! The famous "Quiz Systems" have proved best for your license examination. Used and endorsed by thousands. Private & Commercial Pilots $3.00; Flight Instructor $3.00; Aircraft & Engine Mechanics $3.00; Radio & Instrument Flying $4.00; postpaid or C.O.D. Satisfaction guaranteed. Merritt Wells Pub Co., Warwick 1, N. Y.

A MUST for every Student! Makes flying a lot simpler. "A B C's of Flight," a new book by Paul Housel, covers Aerodynamics, Fundamentals of Flight. Well illustrated. Covers new flight test requirements. Only $1.00, postpaid. Satisfaction guaranteed. Merritt Wells Pub. Co., Warwick 1, N. Y.

WIN YOUR wings, Turner, vol. 1, $3.50; vol. 2, $3.50. Practical Flight Training, Studley, $2.50. Experimental Aerodynamics, Pavian, $2.50. Aircraft Blueprint Reading, Pitman, $1.75. Structural Design of Metal Airplanes, Younger, $3.50. Air Piloting, Simmons, $3.00. Meteorology, Kirby, $1.00. Handbook of Aircraft Stress Analysis, Nye, $4.00. Aircraft Radio, Nye, $4.00. Aircraft Drafting Room Manual, Thompson, $5.00. Flying Facts for Private Pilot, Jones, $2.50. Aero-Quiz, Bartholomew, $2.00. Practical Thermodynamics for Aircraft Engines, Thorpe, $3.50. Practical Aeronautical Engineering, Nye, $4.00. Cadet System No. 1, Aerodynamics, Flight, $3.00. No. 2, Materials, Rigging, Maintenance, Inspection, etc., $3.00. Following discounts per order: 25% $5.00, 30% $10.00, 35% $15.00, 40% $20.00, 45% $25.00, 50% $30.00, 55% $35.00, 60% $40.00 from list prices. Thousands other books. Aero Parts Supply, Municipal Airport, Houston, Texas.

"PILOT'S C.A.R. Primer," covers all the new regulations effective July 1st and August 1, 1945. First publication on regulations. Monthly changes included. Covers new Private Pilots examination; multiple choice review. Contains material not found elsewhere. Don't fail your examination. Only 75c, postpaid. Merritt Wells Pub. Co., Warwick 1, N. Y.

"FLIGHT Instructor's Examination Review," a new multiple choice review book by Paul Housel. Fully covers latest instructor's oral and written examination. Test yourself. Only $1.00, postpaid. Money back guarantee. Merritt Wells Pub. Co., Warwick 1, N. Y.

HERE is the biggest Book Bargain you have ever seen! Publishers overstock! Forty booklet course, by a leading publisher. Regular retail price $12.50. Covers: Aerodynamics, Soaring, Parachutes, Blueprint Reading, Welding, Airplane Construction, Rigging, Propellers, Engines, Carburetors, Weather, Photography, Radio, Etc., Etc. Our special price, while they last, only $4.98 for the set, postpaid. Satisfaction guaranteed. Merritt Wells Pub. Co., Warwick 1, N. Y.

"AERO Mechanic's Questionnaire" by Ralph P. Rice—a comprehensive study for aircraft and engine mechanics. 2000 multiple-choice questions (form as used in CAA examination) and answers on following subjects required for mechanic license: Sheet Metal, Welding; Hydraulics; Rigging; Aerodynamics; Wood, Fabric, Doping; Propellers; Ignition; Lubrication; Carburetion; Power Plants; Civil Air Regulations. $3.00 postpaid or C.O.D. Paxon Publication, Box 479, Lawrence, Kansas.

CORRESPONDENCE Courses and self-instruction books slightly used. Sold, Rented, Exchanged. All subjects. Satisfaction guaranteed. Cash paid for used courses. Complete information and 100-page illustrated bargain catalog Free! Write—Nelson Company, Dept 2-17 Chicago 5

"AIRCRAFT Hydraulic Systems," by E. W. McDonough. Design-Theory-Operation. A specialized branch of aeronautics for students, mechanics, engineers, draftsmen, training schools. Testing and maintenance of commercial and military hydraulic installations treated fully. $2.50. Aircraft Specialties, 134 South Waller Ave., Chicago 44

JET Propulsion and Helicopter Information for experimenters. Make your own jet engines and helicopters. Win fortune—be first to develop practical small jet engines for model airplanes and light planes and gliders. Fortune awaits first to develop gas engine driven, tow-line model helicopter. Circular on plans. Rush name. Houston Maupin, Tipp City 57, Ohio

STUDENT Mechanics: Pilots: Latest type typical C.A.A. multiple choice exams covering all phases of aircraft and engines. Private Pilot exams of the very latest type. Aircraft or engines, $3.00. Combination, $5.00. Private Pilot exams, $2.00. Satisfaction guaranteed. Flight & Ground Tech, Box 3111, Euclid, Ohio.

STEELE'S quality log books, Pilot, Engine, Aircraft and C.A.R. books. Large supply in stock. Dealers send for our 50 page wholesale catalog. Meltz Aircraft, Inc., New Brunswick, N. J.

"PRACTICAL Aerial Photography." New book, just out. $2.00. Aero Devices, 5134 W. Madison St., Chicago 44, Ill.

AERONAUTICAL Books—of all kinds. Scientific, Historical, Reference, Literary. Get started in the fascinating hobby of collecting aviation literature. We can supply any book on aviation, either old or new. Send three cent stamp for latest catalogue just issued. Aeronautical Book Company Box 2641, Detroit 31, Mich.

QUALIFY as Airplane & Engine Mechanic. 1946 texts prepare you for A&E rating (license) exam. Covers all phases required mechanical work, diagrams and latest Civil Air Regulations. Author holds A & E Certificate plus Aeronautical Engineering Degree. Aircraft Text, $1.50. Engine Text, $1.50. Combination, $2.50. Postpaid or C.O.D. Flight Press, Box 101-A Edwardsville, Illinois.

PILOTS: Become a Flight Instructor. Prepare for exam for "Flight Instructor Rating" with new question and answer book. This self-testing book by H. L. Greinke, CAA Certificated Flight and Ground Instructor includes typical examination questions and study suggestions. Digest size, printed large legible type. Easy to read and handle, $3.00. Money back guarantee. Also Quiz books for Commercial $2.50. Private $1.00, Navig-Aid, Cross-Country Planner $1.00. CAR for Private 50c. Hangar Flying, Dept. 41, 112 E. Grove, Bloomington, Ill. Clip this.

STUDENT PILOTS: A complete study course for Private Pilot exam. New Civil Air Regulations plus questions and answers. 84 pages—digest size—printed with large legible type, $1.00. Money back guarantee. Also Quiz books for Commercial $2.50. Flight Instructor $4.00, Navig-Aid, Cross-Country Planner $1.00, CAR for Privates 50c. Hangar Flying, Dept. 42, 112 E. Grove, Bloomington, Ill. Clip this.

INSTRUCTION

ATTENTION Mechanics: Do you want your C.A.A. Aircraft and Engine License? "Ross Aeronautical Services" have spent two years compiling material which will enable you to obtain your licenses within 30 days and we guarantee you to pass your C.A.A. written examinations or every cent of your money will be refunded. Complete multiple choice examinations have been compiled covering every phase of the C.A.A.'s latest written exams and are priced as follows: Aircraft Mechanic $10.00; Engine Mechanic $10.00. If you desire both sets of examinations a reduced price of $15.00 is offered. C.O.D. or Postpaid. You have your Aircraft and Engine License to gain and not one thing to lose so act now! We are the Nation's outstanding specialists on Aircraft and Engine Mechanics C.A.A. written examinations. Ross Aeronautical Services, Dept. F, P. O. Box 1794, Tulsa, Okla.

VETERANS—We invite you to earn your Aircraft and Engine Mechanics License in the CAA approved school of our western mining town. We have housing for you in a new, low cost government project. Our living costs are reasonable and we have the world's best year-round climate. The school is a part of our city school system and is dedicated to providing good training for our veterans rather than to accumulating profits. Your G.I. Bill of Rights will pay your way and provide the beans. We invite you to train for one of the future's most promising fields in one of the west's best towns. Gila County Chamber of Commerce, Globe, Arizona.

COMMERCIAL Pilot written exams are easy after you study our genuine multiple choice examinations used in CAA-CPT programs. The real McCoy. Navigation & Meteorology; both for $2.00. Satisfaction guaranteed. Prompt shipment. Aero Trader, Adams, Mass.

PASS CAA Exams. Use our typical multiple choice questions to help you prepare. Aircraft Mechanics; Engine Mechanics; Commercial Pilots. Only $1.00 each, postpaid, including answer key. Wisconsin Aeronautical Institute, Rt. 2, Box 140, Racine, Wisconsin.

AIRCRAFT & Engine Mechanics, prepare for C.A.A. Examinations. Set of Job Sheets giving step by step instruction on fifty practical test jobs. Ten sets of multiple choice questions and answers covering all C.A.A. required subjects. Both $3.00. Cash or C.O.D. Aircraft Mechanics Information Service, P. O. Box 2635, Jacksonville 3, Fla.

AIRCRAFT & Engine Mechanic Students: Excellent material covering all phases of C.A.A. requirements. Multiple choice exams of the latest type, plus important condensed notes taken from actual study on every subject. Engine—$7.50. Aircraft—$7.50. Combination—$10.00. Also Private Pilot exams, $2.00. Postpaid or C.O.D. Air Mechanics Guide, Box 3111, Euclid, Ohio.

METEOROLOGY Course: Twelve lessons, prepared by former Airline Meteorologist and C.A.A. Ground Instructor. Ideal for all pilots and organized ground school courses. $1.00 per lesson, including examination. Graded examination returned with next lesson. Send today for first lesson! Weathercasts of St. Louis, 2147 Railway Exchange Building, St. Louis 1, Missouri.

PILOTS — Aeronautical Training — new instruction Manual by "Zweng" prepares you on all phases of the examination. Navigation problems are shown solved. Typical new "Multiple Choice" examinations (not found elsewhere) are included. Price, $3.00. Applicant should also have Weems Dept. of Commerce Navigation Plotter, price $2.00 postpaid or C.O.D. Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood. Calif.

AIRPLANE & Engine Mechanics—CAA examinations fully covered with typical multiple choice examinations. New material not found elsewhere. Complete Manual 330 pages, $3.00 postpaid or C.O.D. Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood. Calif.

PRIVATE Pilot's new Multiple Choice Examinations now ready. These new typical examinations cover the material on which the private pilot is examined, i.e.: Parts 43 and 60 (32 pages). Sent postpaid on receipt of $1.00. Aviation Publishers, P.O. Box 442. Studio City. Calif.

BUILD your own BG 6 Utility or BG 8 Two-place Sailplane from government certificated plans. Send 10 cents for illustrated circular. Briegleb Aircraft Company. Van Nuys. Calif.

CASH-IN on your flying . . . earn good money, full or part time. Get a Commercial pilot or Flight instructor rating. We prepare you at home for required CAA examinations. It's easy our way. Success guaranteed . . . Teach friends, neighbors, and local enthusiasts how to fly. You can earn expenses and make a nice profit besides. Write Today: Aero Institute, AC, Adams, Mass.

PATENTS

INVENTORS: Without obligation, write us for information as to what steps an inventor should take to secure a Patent. Randolph & Beavers, Registered Patent Attorneys, 372 Columbian Bldg., Washington 1, D. C.

INVENTORS: Test the commercial value of your patented or unpatented inventions, quickly and inexpensively. Write for free information. Institute of American Inventors, Dept. 124, 1926 Eye St., N.W., Washington 6, D. C.

PATENT your Good Ideas! Send me your simple sketch or model. Free confidential advice—literature. Z. Polachek, Registered Patent Attorney-Engineer, 1234 Broadway, New York City.

INVENTORS—Steps to be taken in obtaining patent protection available upon request. Victor J. Evans & Co., 148-J Merlin Bldg., Washington 6, D. C.

SITUATIONS WANTED

PILOT position wanted with individual, corporation, feeder line. Commercial pilot, single and multi-engine land, instrument, flight instructor ratings, college graduate, single, age 31, references. 4100 total hours (2335 civilian, 1765 military). 2125 hours cross-country, 305 hours nights, 309 hours instrument (94 actual, 111 hood, 104 link), 1848 hours as flight instructor on C.P.T. primary, secondary, cross-country, instrument courses. 1100 hours Army airline first pilot on C-47's and C-54's over land and water. Recently passed airline transport pilot physical and written exams, expect flight test soon. Box 409, c/o FLYING.

EXPERIENCED ex-Army ATC pilot—27—Valid CAA Commercial license, instructor's, instrument, and O-12,000 hp single and multi-engine land ratings. 2500 total hours, 1484 hours four engine time. Over 900 hours first pilot time on C-54's. 154 hours actual instrument time. Have done test work on both Constellation's and C-54's. Four years college. Married. Will consider any kind of flying work either temporary or permanent, however prefer work with airline, feeder line, company pilot or test work. M. B. Holt, Crossville, Ill.

A & E MECHANIC—5 years experience with civilian and military aircraft including light planes and amphibians. Desires position with a future. Interested in maintenance of company, privately owned executive's aircraft, or any position offering reasonable opportunities. Graduate of CAA-approved Aviation School. Veteran of 4 years service in U. S. Coast Guard Aviation. Age 25. Married. References furnished upon request. James Hutton, Jr., 29 Rhodes Avenue, Collingdale, Pa.

AVAILABLE Honorably discharged army pilot, CAA Commercial, single and multi-engine land, instrument, instructor's rating. 1500 accident free hours, 120 hours instrument, 3 years college, 27 years old, 5 years flying experience, 1050 4 engine hours. Have flown and instructed on most army planes from P-51 to B-29. Flew 30 combat missions as 1st Pilot on B-24's. Extensive experience as aerial photographer and Laboratory Commander. Desire position in any of following fields: Airline, Aircargo, Fixed Base, Instructing, Aerial Surveying. Will answer all offers. L. C. Sharrard, RFD No. 1, Emmett, Michigan.

COMMERCIAL Pilot desires flying job with reputable firms, i.e., Oil Companies, Adv. Companies, etc. 9 years rated pilot accident free. Single and twin engine. 1 season on floats waco Y.K.C.; 17 months Royal Canadian Air Force as Pilot; 4 years as pilot with U.S.A.A.F. at present flying twin engine Beech—(Army type C-45). Prefer twin engine. Will answer all offers. Box 410, c/o FLYING.

YOUNG MAN, 18, has sincere interest in aviation and desires position at some airport. Willing to work anywhere as general laborer, mechanic's helper, or anything else, in return for flight training. Reliable, intelligent, and trustworthy. Good references upon request. Norman Vanek, Box 113, Shelton, Nebraska.

COAST GUARD Pilot, over 2000 hours, single and multi land and sea. CAA Commercial and instrument rating experience. Ex-radioman, Helicopter pilot, Navigator, Jato and Rough water rescues, accident free. Any offer considered and answered. Age 28. Married. Box 411, c/o FLYING.

BLAZES!! There must be some one, somewhere that can use a man with 4 yrs. carpenter experience. 2 yrs. Retail ex., who owns a new set of floor sanding machines, married, age 28, no children. Comm. pilot, 1460, Cub to '54; Ex Ferry Div. Army. Now working as machinist. Gad! Box 412, c/o FLYING.

AIRLINE Transport pilot, Army A.T.C. veteran, desires active position as personal or company pilot. No objection to foreign assignment. Box 413, c/o FLYING.

EX-ARMY Pilot desires flying position. Single, age 21. Day, night X-C and instrument experience single, multi engine. 1050 accident free hours, 800 in C-46 and C-47. Commercial license. Go anywhere. Consider all offers. Box 397, c/o FLYING.

NEED HELP? Some company can use me. I can sell your plane, parts, or product to the public. I can produce sales ideas to help you sell. Twelve years in sales work as sales manager and salesmen trainer. Well acquainted in the aviation industry. Operated my own parts distributing firm until recent sale. Commercial pilot several years, good mechanic. I was one of the first flying salesmen in the United States covering my territory by air. Am now sales manager in nonaviation business and wish to get back where I belong. Answer Box 414, c/o FLYING.

AIRPORT Operator—Six years army pilot. Experience—all airport operation work. Eager to operate or start airport for air minded community. Commercial and instructor's rating. College grad, age 28, married, conscientious. Write Box 408, c/o FLYING.

A and E mechanic with seven years experience recently discharged as electrical specialist and mechanic on single, twin and four engine aircraft desires position. Will travel. Write Box 415, c/o FLYING.

NAVIGATION Instructor—Reserve Captain, B.A. degree in Education. 4 years instructing or supervising Advanced Aerial Navigation. Thoroughly capable teaching all phases, specializing celestial. 1010:50 logged hours instructor time. Age 29, married. Desire either teaching or navigator position. Could set up department. Box 404, c/o FLYING.

FLYING and Sailing: Ex-naval aviator requests summer position. Best references and experience in both fields. Call or wire collect Richard E. Moot, 185 Chapin Parkway, Buffalo, N. Y.

AMBITIOUS, young, salesman-pilot will work out of Minneapolis for manufacturer or distributor interested in selling product to aviation market contacting operators anywhere in Minnesota, Wisc., N. Dakota, Iowa and Illinois, flying a clean BT-13. Qualifications, excellent ref's and picture sent on request. Box 416, c/o FLYING.

EX-COAST GUARD Pilot. 2000 accident free hours, CAA Commercial, single and multi engine, land and sea, 130 hrs. instrument. Over water experience. Excellent navigator, 25 yrs. old. Write D. A. Nystrom, P. O. Box 1165, St. Petersburg, Florida.

EXPERIENCED ex-Army pilot, University graduate, desires position with company as pilot, or sales position with aircraft manufacturer. Commercial license, single and multi engine land. 1600 hours —Cub to B-24. 3½ years sales and business experience. Age 29. Married. Box 406, c/o FLYING.

EX-ARMY pilot. Commercial license, single and multi-engine land. 1100 accident free hours. Single, age 22, desires position of any sort to remain active in aviation. Available immediately, will go anywhere, do anything. Make me an offer? Box 391, % FLYING.

AIRLINE Transport pilot, 17 years flying experience, best of qualifications and record. 2½ years flying trans-oceanic airlines, using 4 engine equipment. 2 years Army flight instructing. Desires flying position with individual or Corporation. Box 395, % FLYING.

COMMERCIAL pilot since 1941. Single and multi-engine 4800 hp. Instructor and instrument rating. Accident free. 2100 hrs. in 7 yrs. 2 years college. 2 years ATC. 2 yrs. instructor. Ample instrument and night time. 25 yrs. old, sober, married. Will travel anywhere. Available immediately. Jack Starkweather, 607 42nd Ave., San Francisco, Calif.

EX-ARMY Captain (Service Pilot), age 26, married, 5,000 accident-free hours. Holds all Pilot Licenses, single and multi-engine Ratings. Instrument Rating now being taken. Served as Airline Route Check Pilot in India with ATC. Flew C-46, C-47, B-24's and others. Started flying 1935. Desire job with Feeder Lines, Charter, Instructing Instructed for Parks Air College Army Primary and Instructed Basic and was C-46 Instrument Instructor. Available immediately. Write Bob Seitz, 714 E. Center, Freeport, Illinois.

HELP WANTED

WANTED Immediately—A&E mechanic to supervise and work on light and medium planes. Must have had at least five years previous experience on this type equipment. Permanent job and chance for advancement with rapidly growing aviation concern in metropolitan area. C.A.A. aircraft representative rating desired. Salary starts at $275.00 per month upwards depending on qualifications. Give complete information on qualifications, certificate number, date, experience, etc., in first letter. Box 401, c/o FLYING.

AERONAUTICAL engineers: Excellent opportunities for graduate Aeronautical engineers in design, stress analysis or layout now exist for personnel interested in working on commercial type of aircraft. Write giving education and experience to the Personnel Department, Cessna Aircraft Company, Wichita 1, Kansas.

EXPERIENCED Aerodynamicists, Designers, Draftsmen, Stress Analysts and Flight Test Engineers are needed to work on Experimental and Development work on Aircraft. If qualified write to the Engineering Personnel Department, Chance Vought Aircraft, Stratford, Connecticut.

WANTED instructor and manager. Airport just opening at Earlville, Ill. Give qualifications if interested. R. M. Nichols, Earlville, Ill.

PILOT: Sales Promotion, must have sales, sales supervisory or promotional experience, to fly officials and supervise field sales force; real estate experience helpful, but not required. Must have instrument rating and commercial license. State fully business, flying and sales experience, age and weight. West's Farm Agency, Pittsburgh 16, Pa.

SOUTHERN California ground school instructor wishes to hire a stenographer who would like to collaborate on aviation stories. Write Box 44, Pico, Calif.

AERONAUTICAL Engineers — Thoroughly trained, experienced and qualified to deal with problems in aerodynamics and thermodynamics. Opportunity to participate in development work arising from the application of advanced types of airplane power plant and resulting high speed performance. Write, giving education and experience, to the Industrial Relations Department, Consolidated Vultee Aircraft Corporation, Vultee Field Division, 842 South Lakewood Boulevard, Downey, California.

MISCELLANEOUS

CONTACT Lenses are a natural for you if you must wear glasses. Unlimited field of vision, no fogging. Fliers' visual problems our specialty. Klear Sight Contact Lens Specialists, 7 West 44th St., New York, N. Y.

COLLET Holder & collets. Make yourself with our plans, $.50. "Spur Gear Measurement Tables" $.50. "How to Lower Die Costs" $.50. All three $1.00. R&H Service, R.F.D. No. 1, Spencerville, Ohio.

AMAZING Alnico Magnet lifts 50 pounds! Fits pocket. Literature free. Eyrich, Box 849, Milwaukee, Wis.

WANTED: Pontoons for Heath airplane; also Heath B-4 or Heath-Henderson motor or parts. L. Shaw, 4832 Madison St., Chicago, Ill.

SCALE Model war planes of solid polished aluminum and bronze. Gracefully mounted above ashtray or bronze base. Write for price list and description. The Alexson Co., 740 W. Market St., Dept. 9, Lima, Ohio.

AIRPLANE Photographs—5c each. 2¾"x 4½" size glossy snapshots. Send 10c for sample Thunderjet and huge list containing almost every U. S. built airplane. Henry Clark, Dept. 9, 147-28 90th Ave., Jamaica 2, N. Y.

WAR Air Photos—1914-1918. Glossy photographs of planes and Aces of the first World War. Spads, Camels, Fokkers, Albatross and Crashes. Rare Richthofen Photos. 3c stamp brings price lists. Charles Donald, Box 186, Union City, N. J.

AIRLINE Baggage Stickers—6 different 25c, 18—$1.00, 28—$2.00. E. Smith, Dept. FL, 45 East Banks, Chicago 10, Ill.

400 BRITISH Empire Mixture, 25c, U.S., Foreign Approvals, 5 Nova Scotia, $3.00. Howell-Roeber Stamp Co., Box 448, Anoka, Minn.

WANTED: Fairchild F-8 camera with cut film magazines. Must be in perfect condition. Send particulars to L. Lowry, 60 Pleasant St., Malden 48, Mass.

WANTED: Airport suitable for general operations. Preferably near city population 30,000 or over. Will buy or lease. Give full particulars first letter. Box 398, % FLYING.

GOVERNMENT Surplus AN Hardware. Elastic Stop nuts, aluminum and copper rivets. Write us for your requirements. Ben Brenner, 338 Plane Street, Newark 2, N. J.

2200 LBS. zinc chromated felt packing treated by Sherwin Williams ⅛"x36", weight 56 lbs. per roll—100 square feet to roll. 20 rolls Scotchlite Reflectorlite Material, 2 ft. by 50 yards. 80 gallons 3M Adhesive No. EC-802. Ben Brenner, 338 Plane St., Newark 2, N. J.

FACTORY built midget car, $65.00. Johnson motorbike $45; Servicycle $75; 3-wheel Cushman motorscooter $65; homemade motorscooters $15 up; motors $8 up. Tires for motorscooters and midget cars $1.50 up. Mail order only. Send 25c for new Directory Number 14 just out, listing these and hundreds of other bargains in motorcycles, outboard motors, motorscooters, midget racers, parts, plans, etc. (35c by first class mail). Midget Motors Directory, Athens, Ohio.

TELESCOPES. Real 17 power telescopes, $2.90. Send $1 deposit, balance C.O.D. United Co., 2309-FL Lawrence, Toledo, Ohio.

SURRENDER Documents — Pacific in facsimile, 30c, plus 20c handling charge. J. Weinman, Box 54, Jericho, N. Y.

WANTED: 5,000 dollars secured by 1st mortgage on a Dude Ranch in Wyoming. Have applied for a private airport on the land. Pack trip vacations, lake and stream fishing, big game hunting in season. Box 405, c/o FLYING.

FOR SALE—Private Airport, 85 miles north N.Y.C. All improvements. A. Coles, Box 23, Wappingers Falls, N. Y.

AVIATORS—Join Hobby Clique. Correspond, exchange with members everywhere. Free listing. Send hobbies, occupation, age. Raymond Dow, 2922 164th Street, Flushing 12, N. Y.

SMART Tempera painting of your own warplane 16x20. Markings and external detail with order, $15.00. Welchcraft, 1226 Forest Road, New Haven, Conn.

FOR SALE—Airport with grill and restaurant. The grill is well established, doing a good business. Beer and liquor license, living quarters, oil heat. Airport under construction 3,500 to 4,000 ft. Runways. Material for hangar 100x150 ft. 5 miles from city of Albany, N. Y. $40,000. For further particulars write Box 417, c/o FLYING.

LEATHER Insignias, made to order for your flying jacket. Send sketch for prices. Julie's Leathercraft, Lone Tree, Iowa.

MILITARY Insignia: 22 different for $1.00 (Value $4.60). Introductory offer, never before equalled. Prices and Insignia Guide 10c; sample 5c. Hobbyguild, G35 West 32nd St., New York, N. Y.

POWER, Speed, Thrills! Now available, a few new 55 H.P. outboard motors, well made 4 cyl., 5,500 RPM, produced by Evinrude to Army specifications. Wt. 198 lb. Shipped in strong plywood box. $410.00 FOB. Other savings. Write for list. M&E Marine Supply Co., Dept. F, P. O. Box 601, Camden, N. J.

GET one of those marvelous inflatable rubber boats! 5 man capacity, $49.00. "Mae West" inflatable type Life Preserver, light weight, worn as vest. Easily inflated. $2.00 Postpaid. Other bargains. M&E Marine Supply Company, Dept. C, Post Office Box 601, Camden, N. J.

UNUSUAL Home Movies: Travel, Adventure, Sports, News, War Films. Many film bargains. Big 1946 Catalog and sample, Dime. Audet, Box 6520-KG, Philadelphia 38, Pa.

GENUINE German Medals, secured from homecoming G.I.'s. Limited number available. Other Foreign Souvenirs. Price list, 10c. Hobbyguild, L 35 West 32nd New York, N. Y.

YOUR name and wings in 23 karat gold on leather patch. Army, Navy, Aircrewman, A.O.P.A., N.A.A., C.A.P., C.A.A. Mechanics or Civilian, $1.00 each or 3 for $2.00. Names only 3 for $1.00. Pin-on type patch with double pins and safety-catch, name and wings $1.50 each, name only $1.00 each. Julie's Leathercraft, Lone Tree, Iowa.

TYPEWRITER Repairing—Original Course—Simplified Home Study. Weber Typewriter Mechanics School. Box 269 Osborn, Ohio.

MAGIC: Aircraft cleaner and polish. Leaves a hard, dry, bright surface, reduces drag, increases life of covering, protects against grease, water, dirt and corrosion. Ample supply, $2.00 postpaid. Ask your dealer or order direct for early shipment. Aero-Trades System, 2 P Adams, Mass.

AIRCRAFT Maintenance and service Engine overhaul—Magnafluxing any type of aircraft. We modify and certificate military aircraft on a production basis. 14 competent mechanics to do your work. Central States Aviation Company, Kent County Airport, Grand Rapids, Mich

HAVING Car trouble? New, used, guaranteed auto, truck parts. Save money Transmission specialists. Describe needs, immediate reply. Victory, 2930L North Western, Chicago 18.

AGENTS wanted for complete line of sunglasses. Military metal style and plastic. Good commissions. Paramount Sunglass Co., 1133 Broadway New York 10, N. Y.

LOOK — 24-Hour Watch Dials fit any watch. 1 minute to apply. 15¢ each—2 for 25¢. Send cash to Aviation Enterprises, Dept. 1. P. O. Box 671. Gallup N. Mex.

REAL Photographs of all the latest Allied and enemy aircraft. Also World War I. Send 25¢ for sample photo and illustrated 52-page catalogue listing nearly 4,000 photos. Over 250,000 photos in stock. Aeroplane Photo Supply. Box 195 Toronto, Canada.

BUSINESS OPPORTUNITIES

FINANCIAL success in your own business or profession. The art of knowing how. $1.00. Altone's, Houseman Building (Dept. G), Grand Rapids, Michigan.

TAKING over huge naval base, have excellent facilities for aeronautical enterprises. Will give exclusive lease for an approved repair station. Sanford School of Aviation, c/o Mr. Edward Higgins, Chamber of Commerce Building, Sanford, Florida.

AIRLINE Opportunities. Get a job in this fast growing industry. Confidential report plus how, where to apply: $1.00. Air Transport Research and Advisory Service, Box 1044, Kansas City, Mo.

I Learned About Flying from That!

(*Continued from page 59*)

trol and advised them of my predicament. My version, I believe, was the understatement of the century.

While returning to the ramp, I finally performed a thorough cockpit check which should have been accomplished well before I had taxied out to take-off. The results were embarrassing. I discovered that in the course of washing the plane the night before, the mechanics had rolled the rudder trim tab full right and the elevators had been turned to a full nose-down position!

No visibility, no flaps for take-off, full right rudder and nose full down, not to mention the fact that I hadn't checked the magnetos, were enough to kill a seasoned pilot if he were stupid enough to do what I had done. But I lived to learn. The old *Valiant* was my girl from then on. As abused as she had been, she still set me down safe on those two sturdy legs of hers and neither of us suffered a scratch.

What the instructor had to say to me later burned my ears to a crisp but even his stern lecture failed to carry the forcefulness of that terrifying lesson that I had just experienced.

Never again will I take off with my head out in the slipstream and, above all, I'll make certain that a thorough cockpit check has been made. END

Photo Credits

The following list shows the source from which pictures used in this issue were gathered. Where a single page is indebted to several sources, credit is recorded left to right, top to bottom:

4—ARTHUR HAUG
17—CAA
18—ARTHUR HAUG
19-23—WALTER STEINHARD
24—NORTHROP
25—LAWRENCE LOWRY
26—CYRIL PECKHAM
27—FOX PHOTOS LTD., CHARLES E. BROWN, MILES AIRCRAFT
28—CYRIL PECKHAM, CHILTON, AUSTER AIRCRAFT LTD., JULIAN S. KRUPA
29—CHARLES E. BROWN, *Aeronautics*, PERCIVAL, AVRO, *Flight*
30—FAIRCHILD
31—TOMMY WEBER, FAIRCHILD
32—NED SCOTT, WILLIAMS & MEYER CO., STUDEBAKER CORP.
33—HANS GROENHOFF, METRO-GOLDWYN-MAYER
34—MAX KARANT
35, 36—R. G. SMITH
37, 38—JULIAN KRUPA
39—WILLIAM FLYNN, ROTERON, BELL, FRANK ROSS
40—CANADIAN TRAVEL BUREAU
41—STREET PHOTO SUPPLY CO., NATIONAL FILM BOARD, CANADIAN TRAVEL BUREAU
42—JULIAN KRUPA, AAF
43—JULIAN KRUPA
44—USN, SIGNAL CORPS, ACME
45—ACME, AAF
46—BLANCHARD'S STUDIO
47-49—WALTER STEINHARD
50—PAN AMERICAN
51—USN, MIKE ROBERTS
52-54—CHARLES E. BROWN
56—BELL, HOWARD LEVY, BELL
57—FLOYD MCCARTY, USN, *The Aeroplane*, MAX KARANT, DOUGLAS
58—NORTHROP, EARL E. SPIELMACHER, WILLIAM T. LARKINS, PIPER
59—CLEMENT G. SCERBACK
70—JAMES B. GOGGIN
98—W. R. PRICE

Announcing

A NEW PUBLICATION DATE FOR

FLYING

Beginning with this issue the sales date of FLYING is the 20th of each month preceding month of publication.

Be sure to read FLYING every month for up-to-the-minute news, developments, and authoritative information on what's going on in the air.

With its new low price and many new features FLYING is now, more than ever, the greatest value in aviation. Because of the paper shortage the number of copies available is limited. Therefore, we urge you to reserve your copy now at your favorite newsstand or, better still, take advantage of the money-saving prices for mail subscriptions.

NOW ONLY 25c PER COPY

By Mail: 3 years, $7.00
2 years, $5.00
1 year, $3.00

FLYING
185 NORTH WABASH AVENUE
CHICAGO 1, ILLINOIS

ENGINEERS WANTED

Mechanical
Electrical
Civil

Preferably those with

EXPERIENCE ADAPTABLE TO AIRCRAFT

Layout Draftsmen
Aerodynamicists
Stress Analysts

Or others with at least several years of engineering experience which will serve as a basis for aircraft work.

Permanent positions are available in the engineering of such planes as the Martin 202 transport, commercial version of the Martin MARS, and other new commercial and military commitments. Write including full information on education, experience and background.

to Director of Engineering Personnel,

THE GLENN L. MARTIN COMPANY
BALTIMORE 3, MARYLAND

STAMMER?

This new 128-page book, "Stammering, Its Cause and Correction," describes the Bogue Unit Method for scientific correction of stammering and stuttering—successful for 45 years. *Free—no obligation.*

Benjamin N. Bogue, Dept. 5269 Circle Tower, Indianapolis 4, Ind.

GET THIS FREE BOOK